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THE FAR EASTERN REVIEW

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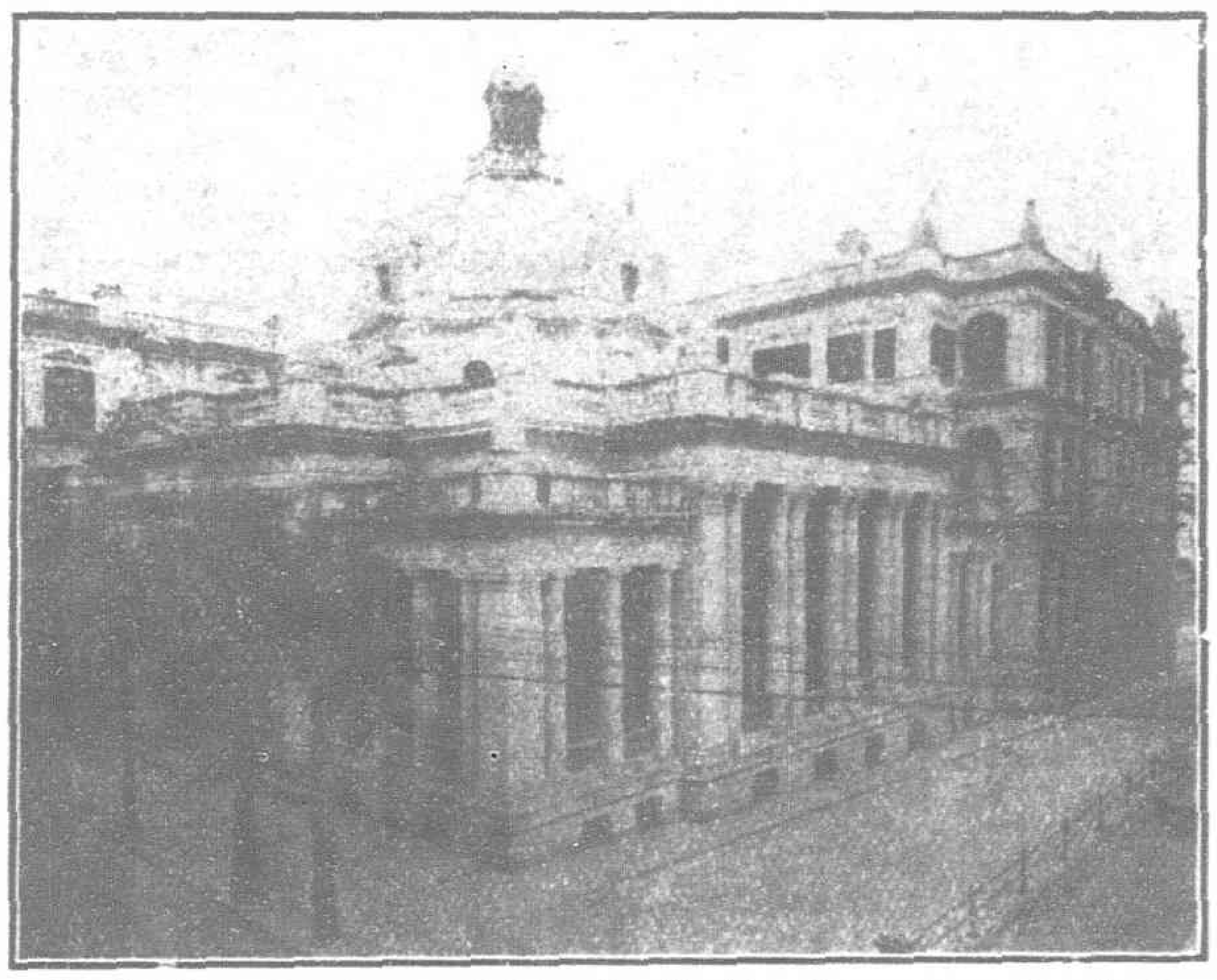

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THE FAR EASTERN REVIEW
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VOL. IX. SHANGHAI AND MANILA, NOVEMBER, 1912 No. 6.

River, Lake and Land Conservancy in Portions of the Provinces of Anhui and Kiangsu, North of the Yangtsze River

Preliminary Report of Charles Davis Jameson, Mem. Am. Soc. C. E., American Red Cross Engineer

FOREWORD

In those portions of Anhui and Kiangsu which lie north of the Huai River, the Hungtze Lake and the old bed of the Yellow River, south of the Province of Shantung and the present bed of the Yellow River, and extending east and west from the sea to the Ke River, is a section of country which has known but little rest from floods and subsequent famines for the last two thousand five hundred years.

This section is a portion of China's great alluvial plain, extending from the mountains on the West to the sea, and from Shan-hai-kwan to Hanchow. All of this plain is in process of building; no part is finished, but the least finished portion is that mentioned above, and the changes which are going on in this section form one of the most interesting examples of continent building at present in existence.

CHARLES DAVIS JAMESON.

What adds to the interest of Nature's work going on here is the fact that we have the history of this section—physical, geographical and human—for the last twenty-five centuries at least. Authentic records show the changes in the river channels, the swinging north and south of the Yellow River, which during that time has passed into the sea at various points between Shanghai and Tientsin, also that at one time—some twenty centuries ago—much of the water of the Yangtsze went into the sea at Hanchow, whilst another portion flowed north into the Huai River and thence to the sea, down the now-called old bed of the Yellow River, ten centuries before the Yellow River made its last visit south.

In addition, the records of the various cities and districts give the years of flood and famine and the amount and kind of relief given to the sufferers; taxes remitted year after year, millions of ounces of silver and tons of free grain. The records also show more or less the work done to prevent the floods, or at least many of their evil effects, and in these records of the work the most noticeable fact is, that whilst enormous sums were appropriated for the building of dams, dykes, and embankments to hold and confine the water and to safeguard certain restricted areas, comparatively little or nothing was done to deepen channels or furnish means for the free and quick passage of the water to the sea. The lower reaches of the rivers were allowed to silt up until there was no adequate outlet, the embankments were raised, the unprotected areas were flooded, and eventually the embankments were broken, and floods and death and famine followed, and with this came immense appropriations for the repair of these embankments, until one can almost believe the truth of the old Chinese saying regarding the conditions which have obtained for centuries on the Yellow River, "how would we get paid for catching the tiger if he never escaped?" In modern works of this description the object is not only not to catch and confine this tiger, but to allow him to escape by a well prepared and most obvious road as quickly as possible.

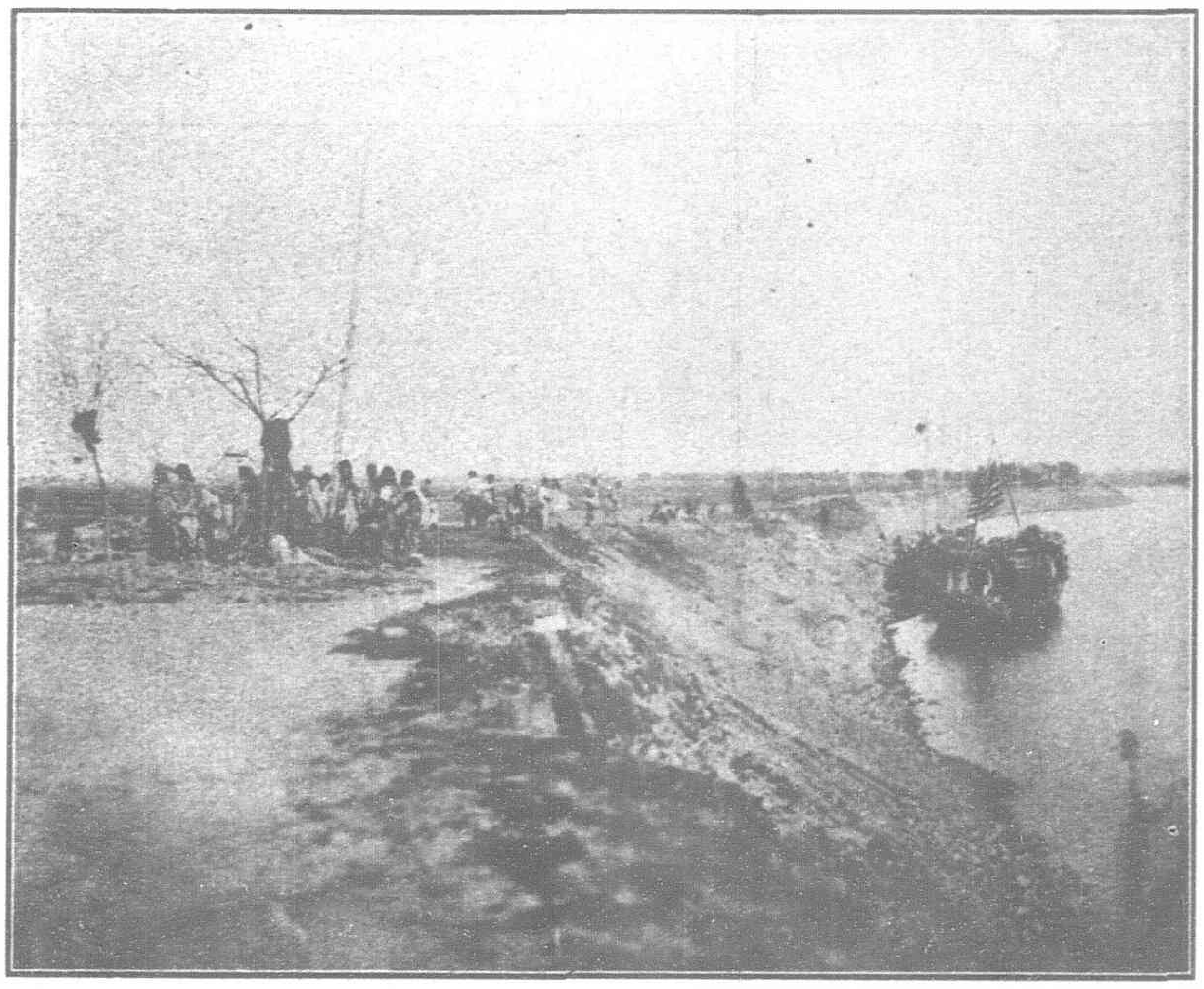
During the last ten or twenty years the frightful suffering due to these floods has been brought to the notice of western nations through the foreign missionaries, and year after year hundreds of thousands or even millions of dollars have been poured into China for the relief of the sufferers, three quarters from the United States and most of the remainder from Canada. Year after year this money from outside has gone to feed China's starving millions, and much of China's money has gone the same way, but in all these years China has not made one single effort to have the cause of these almost annually recurring floods investigated, and to ascertain whether it were not possible to lower the flood level and thus do away with the cause of the famines.

The floods have so increased in frequency and the famines in acuteness that now, over the whole area under consideration, the farmers do not average more than two crops in five years, where, if the floods were eliminated, the normal condition would be two large crops each year, and this loss is an ever increasing one. There is but small chance for the people to recuperate. Year after year they plant and the crops are lost. Then there comes a year when there is no seed to plant, then no animals with which to plough, then no ploughs or other farm implements; the house furniture follows, sold for food or used for fuel; then two families move into one hut, and the extra hut goes for fuel with which to boil weeds and the bark of trees; this gone the people steal, murder, beg, and often resort to cannibalism, and thus one of the richest agricultural sections of China is in such a condition that even robbers are becoming discouraged. No work of any kind is done to improve the rivers, the upper reaches are grown up with reeds, and plants, and the water cannot get away but spreads over the land, making swamps where once were rich fields.

Until this year (1912) the greater portion of Famine Relief has been given free to the sufferers, with the result that to the number of the real victims of the floods have been added all the professional beggars who could work themselves into the crowd, and all persons too lazy to work but not too proud to accept charity, and who had a pull sufficient to procure a famine ticket.

This year, with the exception of old, sick or extremely young people who have no one to work for them, all who get relief have to work for it, and one man's work will feed five people. The result has been satisfactory. The number actually entitled to relief has been reduced by fully one half, and all the work done has been located and laid out so as to make it of permanent conservancy value, the work being either the building or repairing of dykes or the excavation of drainage canals and ditches and the cleaning of the existing canals.

During the summer of 1911 the National Committee of the American Red Cross and the Department of State decided that an Engineer should be sent to China to make a thorough examination of this flood and famine region, with a view to designing some scheme by means of which the flood level could be lowered, the rivers properly trained, and the swamps and shallow lakes drained and made available for agriculture. Through the American Legation in Peking this offer was conveyed to the Chinese Government, which accepted it with much pleasure, stating that it would furnish all the assistance the American Engineer might need in the way of survey parties, etc., and would also pay the field expenses of such parties and the expenses of the American Engineer from the time of the arrival in China until his preliminary examination and work were completed, the National American Red Cross paying the salary of the Engineer sent. I had the honour to be appointed by the National Committee of the American Red Cross with the approval of the Department of State for this work, and arrived in Peking on July 16th, 1911.



DYKE REPAIRING ON THE GRAND CANAL

PART I

As the boundary lines between the different provinces—portions of which are included in the area to be studied—are in no way connected with the topographical features of the country but are purely arbitrary lines, no provincial distinction can be made in the study of the various river systems, or the designing of the work to be done for the lowering of the flood level and the proper draining of the country. The whole area under consideration will simply be treated as a whole in this study, and when the actual work of construction commences it must all be treated from a national standpoint as to finances, personnel, and the methods and sequence in which the work is carried on.

The area to be studied extends from the sea coast on the east to longitude 113° on the west, and between latitudes 36° and 31° on the north. This area in a general way includes the catchment basins of all the river systems involved, and covers approximately one hundred thousand square miles. It contains portions of four provinces, Shantung, Honan, Anhui and Kiangsu, and lies between the Yangtsze River on the south and the Yellow River on the north, and within it is the Flood and Famine Region of North Anhui and North Kiangsu.

TOPOGRAPHY

Along the western and south-western borders of this area rise the mountains of Honan, the foothills of the mighty Himalayas. They push through the south-west corner in an east by north direction, following more or less the direction of the Yangtsze River, and form the divide between it and the Huai-ho. As isolated hills they continue to the north-east until they join the mountains of Shantung. With the exception of this divide between the Yangtsze River and the Huai and the isolated hills, the entire area extending from the mountains of Honan to the coast is one vast alluvial plain in the making and not yet finished.

THE DIP OF THE ALLUVIAL PLAIN

The dip of this plain is as a whole to the southeast, but an examination of the Map will show that the rivers flow in all directions except west.

CLIMATE

The climate is of a mild and temperate character, the thermometer ranging from a maximum of 100° Fah. to a minimum of 20° Fah. The winter is short; the ground freezes to a depth of from two to three inches, and none of the rivers or lakes become covered with ice.

The soil is a light alluvial and of great richness, with the exception of some fifteen miles along the sea coast, where the elevation is not as yet sufficient to free it from salt.

RAINFALL

The rainy season is during June, July and August. Some rains occur during April and are of much benefit to the crops. The rainfall is ample, and when the rivers have been properly cleaned and regulated and provided with outlets, all ordinary floods will be eliminated.

It is impossible to ascertain the average number of inches per normal year, as no records have been kept, but the Chinese records show that years of drought are almost unknown.

At times local rains of great magnitude occur within the famine area. In June, 1910, there was a local downpour in the region of Szechow, Ling-pi and Nan-Suchow, lasting some forty-two hours, during which it was estimated by the Divisional Engineer of the Tientsin-Pukow Railway that twenty-four inches of water fell.

No cleaning of rivers or opening of outlets will prevent much damage being done by such a rainfall as this. The mere force of the falling water will pound any standing crop flat to the ground and make it a dead loss. But whereas now the condition of the rivers, drainage canals, etc., is such that even a moderate amount of rain water cannot run away, but stands weeks on the ground until it soaks into sodden, swamplike soil or is evaporated, after the rivers and canals have been put into proper condition, even excessive rainfalls will be able to run off within a few hours, and leave the land in a condition for use. Abnormal storms will always and everywhere cause immediate damage by breaking down the crops, and no work of man can prevent this. The only thing possible is to so conserve the rivers and canals that the waters can pass away as quickly as possible.

AGRICULTURE AND INDUSTRIES

This entire area is strictly one of agriculture. There are no industries of more than local importance, and the existence of these is due entirely to the lack of means of transport.

The agricultural products of North Anhui and North Kiangsu are roughly as follows:—

Wheat.—The most valuable crop. This is sown in the autumn and harvested about the end of May. If there are no spring floods and the rainy season is normal this crop is very large.

Barley.—Sown in November and reaped the end of May. The amount raised is small and relatively unimportant.

Small Pea.—Sown in the wheat in the spring and often harvested with the wheat intended for home consumption; otherwise harvested after the wheat.

Tall Millet.—Planted in April and harvested during the latter half of August.

Small Millet.—Harvested about the first half of August.

Indian Corn.—Harvested about the middle of July.

Sweet Potatoes.—Planted in May and gathered in August.

Oil Bean.—Gathered after the wheat.

Hemp.—Not very important.

Cotton.—Not very important.

Sesame, *mustard*, *opium*, *peanuts*, *tobacco*, *cabbage*, *carrots*, *radishes*, and a fair *celery*.

THE SURVEYOR'S HOUSEBOAT

These constitute the staple crops, and of these wheat, oil bean and tall millet are the most important.

Up to 1908 the northern portion of the flood region in Anhui was three quarters planted with the poppy. This was prohibited without previous notice, and the people have as yet found nothing to replace it. Buckwheat has been tried, but so far with little success. All the years since the prohibition of the poppy have been famine years, and the small farmers have had no chance to adjust themselves. The opium was an exceedingly valuable crop per unit of ground required and unit of weight of the product, consequently it was the crop for the small farmer, and its prohibition has caused much suffering.

In addition to the above-mentioned staples there is an abundance of good fruit in season, cherries, apricots, peaches, pears, grapes, small melons and water melons.

Owing to the lack of any water power and the absence of coal deposits, it is probable that when the conservancy scheme shall have been fully established and the land put into condition to bring forth its full abundance, it will be cheaper to transport the raw material, cotton, grain, beans, etc., to some central point for the production of the finished article, rather than to establish local mills and factories, but this is one of those economical problems which time alone will solve.

RIVERS AND LAKES OF THE FLOOD REGION

The main river systems of the flood region are three, viz. the Shu River, the Yi River, and the Huai River.

The Shu River has its source in the mountains of the southern portion of the province of Shantung, flows south into the province of Kiangsu, then swings to the east through nearly one hundred and eighty degrees and passes into the sea in a north by east direction near the city of Haichow.

The Yi River has its source in the mountains of the southern portion of the province of Shantung to the west of the Shu River, flows in a south-westerly direction, and empties into the Grand Canal through some five channels, the most southern one being at Yaowan in the province of Kiangsu. The catchment basin of the two rivers is about eighteen thousand square miles.

The Huai River has its source in the distant mountains of the province of Honan and flows east by north into the Hungtze Lake. It has some eighty large tributaries, and drains, or rather does not drain, a catchment basin of some seventy thousand square miles.

In the Huai River system are included not only the rivers which empty directly into the Huai River, but all of those that empty into the Hungtze Lake, as this lake is merely the backwater of the Huai due to the filling up of the regular outlet of the Huai to the sea.

LAKES

The Hungtze Lake, which is merely the backwater of the Huai River, due to its lack of suitable outlet, has an approximate area of four hundred and fifty square miles The greater portion is less than four (?) feet in depth at normal low water, the deepest part being along the southern shore, the old channel of the Huai River when it had free access to the sea, before 1300 A.D.

Description of the Three Rivers

The Shu and Yi Rivers are distinctly torrential in character. Rising in the deforested mountains of Shantung, a section subject to heavy rains, the upper reaches of these rivers have a steep fall, and the lower reaches, after passing into the alluvial plain, a fall of but a few inches to the mile. In the case of the Shu its course to the sea is long and winding through this alluvial plain, a distance of 85 miles. The last twenty miles near Hai-chow are much silted up, and the consequence is that after a heavy rainfall in the deforested mountains, where there is nothing to absorb the water, it rushes down the steep incline of the upper reaches in a torrent, and upon reaching the flat country with the channel more or less silted up and in no way equal to the rapid carrying off of the large amount of water forced into it, the banks are overflowed and the country flooded, until it becomes one vast shallow lake. Eventually the water passes to the sea by innumerable and unsurveyed canals and creeks.

The whole section of Kiangsu north of the old bed of the Yellow River and east of the Grand Canal is one vast network of canals and small rivers, with their beds so little below the level of the surrounding country that only comparatively moderate rains are necessary to create floods.

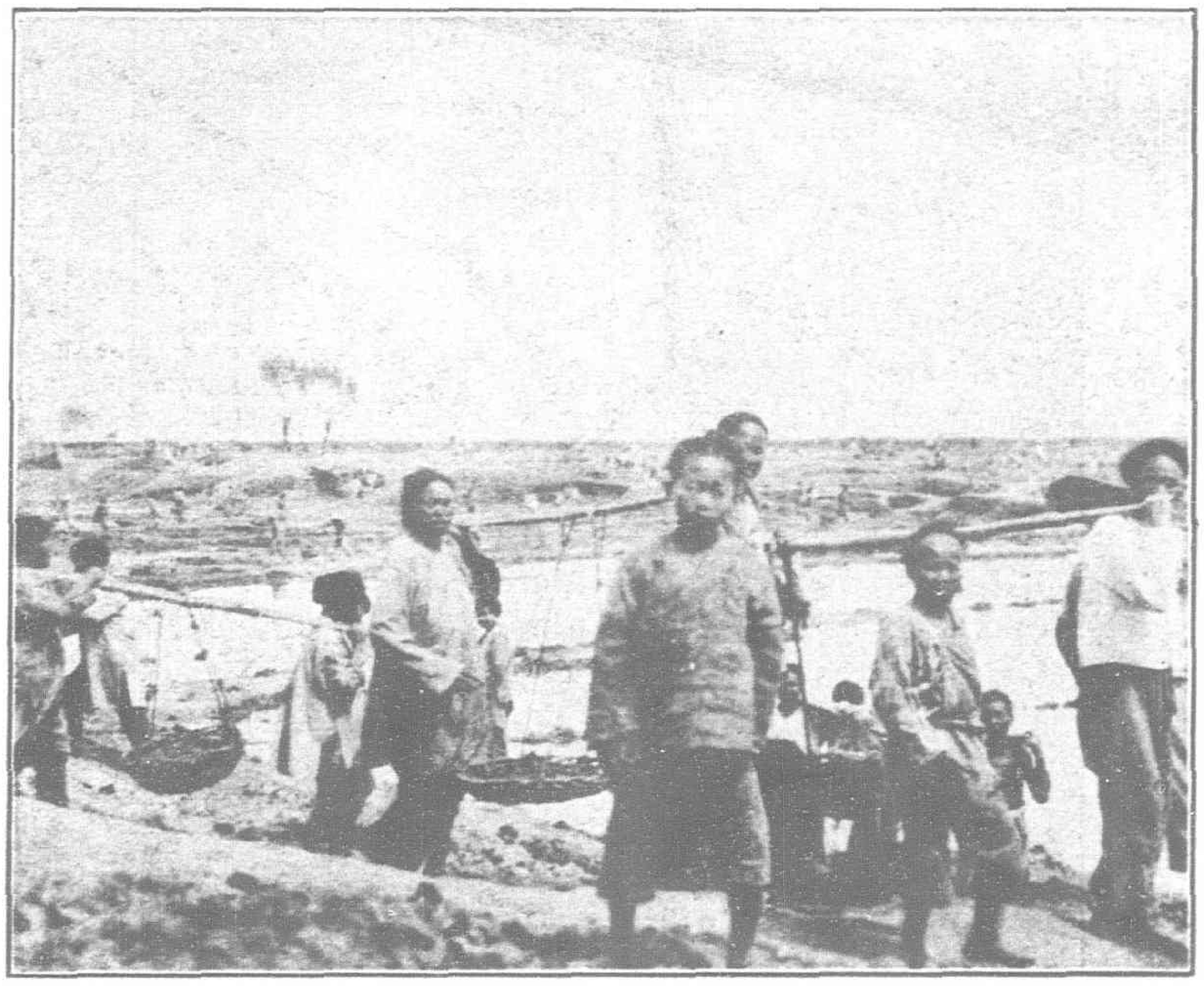
The Yi River, as before mentioned, discharges into the Grand Canal. During the dry season both this river and the Shu discharge but little water and are in no sense navigable, but after rain this Yi River becomes a torrent which pours into the Canal, tearing away the western dyke (if it has been repaired since the previous floods), and flooding the country on both sides of the Canal. During the rainy season the river often rises ten or fifteen feet in twelve hours, and sweeps all before it. This torrent, loaded with silt, rushing down the Grand Canal, eats away the water face of the dykes, and eventually all the silt is deposited in the Canal and its bed raised. Consequently the Canal is to a great extent injured for navigation in the portion between Yao-wan and Sochien. The Yi River is also the principal feeder of that portion of the Canal from Yao-wan south, but this water supply is insufficient during the dry season, owing to a great extent to the fact that the water is dissipated in some five distinct channels, and during the rainy season, owing to the lack of regulating works of any description, the torrents cause much damage.

The Huai River

The Huai River and all its tributaries as far east and including the Ke River have well-defined channels, and these channels are for the most part of sufficient capacity to handle ordinary floods. Even during the abnormal flood of 1868 and the greater one of 1911, comparatively little damage was done west of the Ke River, and no acute famine caused.

To the north of the Huai River and the Hungtze Lake the watershed extends to near the Yellow River, and much of the actual distance to the southern dyke of the Yellow River.

To the south of the Huai River and the Hungtze Lake the watershed is narrow. The ground rises sharply to the divide between the Huai and the Yangtsze, and the amount of water flowing north from this side is a negligible quantity in any general scheme of conservation.



FAMINE RELIEF WORK

Men, women, and children, were employed building and repairing dykes, the whole of the material for such purposes being carried in baskets as here depicted.

The Critical Section of the Huai River

The section of the Huai River which must receive the greatest study is that portion east of the Ke River, and the continuation of the Huai River, the Hungtze Lake.

The Huai River discharges into the Hungtze Lake, and this lake has no adequate, visible, well-defined outlet through which the vast amount of water poured into it from the west may with equal rapidity pass out of it in any direction, east or south.

The dip of the country is in general to the south-east. The southern shore of the lake is rather well defined by highlands and hills. The eastern and south-eastern shore for some forty-five miles is well defined by the Ming dyke, and to the north of this, extending towards the north-west, by the magnificent embankment of the old bed of the Yellow River.

The Ming Dyke

This dyke is some 25 feet in height, 300 feet wide at the base, and some 150 feet wide at the top. It was first built during the early part of the Ming-dynasty (1468) and of earth only. Although destroyed in parts by extraordinary floods, it was kept in comparatively good condition until large sections were swept away either just before or just after the commencement of the Ching-dynasty. The second emperor of the Ching dynasty, Kang-he (1662-1723) not only thoroughly rebuilt and repaired it, but added to its resistance to floods by facing the entire water side to a height of twelve feet with fine ashlar masonry laid in impure lime mortar almost equal to natural cement, each course being about sixteen inches in thickness, alternating headers and stretchers. The monumental work is in good condition to-day, and is a striking example of what the emperors of China once did for the good of the people and the country.

This dyke was built to protect the Grand Canal between Thsing Kiang-pu and the Yangtsze River (133 miles) from the floods of the Yellow and Huai Rivers, and thus save from absolute destruction the whole section of rich and densely populated rice country east of the Grand Canal and south of the old bed of the Yellow River, known as the Hia (Low) country.

The Grand Canal

One of the most important features, both from a topographical and hydrographical standpoint in any study of the river systems of North Anhui and North Kiangsu is the Grand Canal. As shown by the map, this canal leaves the north bank of the Yangtsze opposite the city of Chinkiang, and runs for a distance of 133 miles north to Thsing Kiang-pu. Just north of this place it crosses the old bed of the Yellow River and runs in a north-westerly direction to the borders of Shantung and beyond, eventually reaching Peking.

The main object of this canal was the safe transport of tribute rice, foodstuffs and treasure from the rich lands of the south to the Imperial Court at Peking, the passage by sea from Shanghai or other ports to Tientsin, the port of Peking, in Chinese junks, being attended with much danger from both the sea and pirates. The loss in grain, treasure and life (named in the order of their importance) was so great that the expenditure necessary to construct the canal and operate it was justifiable at the time. The present canal was completed during the Mongol dynasty, and for six hundred years afterwards, until the arrival of coast steamers and later the railways, was of great value. Even at the present date, although the through traffic to Peking has been discontinued, the canal is of immense importance as a transport route to the country through which it runs, and would well repay the cost of being put into throughly good repair and of being well maintained.

The only part of the Canal now under consideration is from the Shantung border to the Yangtsze. The width is from 200 to 400 feet and the depth from 2 to 10 feet, depending upon the locality and the time of the year with reference to the water supply. The water is confined between artificial embankments, and in much of its length not only is the surface of the water much above the level of the adjacent country, but in many parts the bed itself of the canal is so too. This difference in elevation varies from 0 to 20 feet or more, and as the Chinese up to the present time have expended all their labour in increasing the height of the dykes and none upon lowering the canal bed, the condition becomes worse each year and the danger more imminent.

The line of the canal crosses the dip of the country at a large angle, and consequently for the whole of its length from Nan Wang Chang-tcha in Shantung where the water divides, some flowing north and some south to the Yangtsze River, a distance of 500 miles, the canal with its high artificial dykes acts as a dam to all the natural outlets to the sea for the rivers having their sources on the west side, the most important of these being the Huai River.

The successful handling of the Grand Canal, in the maintenance of unbroken transport facilities, a minimum allowable depth, a carefully regulated water supply and the passing of the Huai River floods through it, is one of the most important and delicate problems of the proposed conservancy.

The canal acts as a great obstruction to the passing away of the heavy rainfall which causes the floods, the long duration of which is caused to a great extent by the canal, and reacting are the greatest source of danger to the canal and the greatest source of damage to it, being a constant menace to its dykes, which if broken on the eastern side endanger the entire usefulness of the canal, and even if the breaks do occur much of the flood waters are of necessity obliged to find an outlet through the canal, as the canal itself cuts off all other outlets; and thus each year, during the months of June, July and August at least, the canal is required to carry away an amount of water much beyond its maximum capacity. This is a source of great danger to its dykes, and even if they do not break they are likely to be badly damaged, and a great quantity of silt is deposited which necessitates the dredging of the channel (which is never done), or the increasing of the height of the dykes (which is sometimes done). As a matter of fact nothing is usually done until a serious break occurs in the dykes, much damage is done to the low (Hia) country, and valuable crops are lost with some lives, and then the repairs are made in a weak, cheap, temporary manner at a tremendous cost. With proper outlets the flood level would be lowered, the length of duration of the floods reduced, the land drained, and the danger and damage to the canal reduced to a minimum.

FAMINE RELIEF WORK

As has been before stated, the land on the east of the canal is much lower than that on the west, from the Yangtsze River to Thsing Kiang-pu, and north from Thsing Kiang-pu to about Sochien. The cause of this is that during the centuries in which the canal has been in existence it has acted as a dam to the waters coming from the north-west, and consequently the greater part of the silt brought down by these floods has deposited on the western side, gradually building up the country, the land to the east receiving only the silt carried somehow across the canal in times of excessive floods.

THE TIENTSIN-PUKOW RAILWAY EMBANKMENT

Within the last few years a new and disturbing feature has been added to the topography of North Anhui, which requires careful study with regard to the conservancy scheme. This is the embankment of the Tientsin-Pukow Railway, which, as will be seen on the Map, extends north from Peng-pu, on the Huai River, to Suchow-fu, in the province of Honan, crossing the line of the dip of the country at an angle of 60 degrees more or less. This embankment is from ten to forty feet in height, and forms a barrier to the natural flow of water in times of flood. A most careful study of flood conditions and the amount of water to be handled was made by the Railway Engineers, and as far as could be foreseen ample openings have been made for the passage of the flood waters in such a manner as to prevent serious damage to the railway embankment, and the great floods of 1910 and 1911 passed without breaking this embankment; but whereas before its construction the flood water flowed from the north-west to the south-east in one vast sheet and the floods subsided in days, now the water having to flow south and pass through definite openings is much retarded in its subsidence, and possibly weeks are required.*

THE PRINCIPAL CAUSES OF THE FLOODS IN THE SO-CALLED FLOOD AND FAMINE REGION. THE HUAI RIVER BASIN.

The entire Huai River catchment area discharges its waters into the Hungtze Lake. The bed of this lake is comparatively high, and is slowly being raised each year by the deposit of silt which it receives from the Huai and the other less important rivers coming in from the north and north-west. It may be said, however, that the percentage of silt held in suspension by the flood waters of this region is small as compared with that of such rivers as the Hai ho at Tientsin, the Yellow River and the Yangtsze, but what there is is deposited in the Hungtze Lake which has no adequate outlet. The floods come from the west, north-west and north. The country has a minimum of dip and no outlet, therefore the greater part of the inundation in North Anhui is not due to the rivers overflowing their banks, but is caused by the backwater of the Hungtze Lake and the lower reaches of the Huai, due to the fact that neither the Huai nor the Hungtze Lake have an outlet at all in proportion to the immense amount of water which is poured into them in a short period of time.

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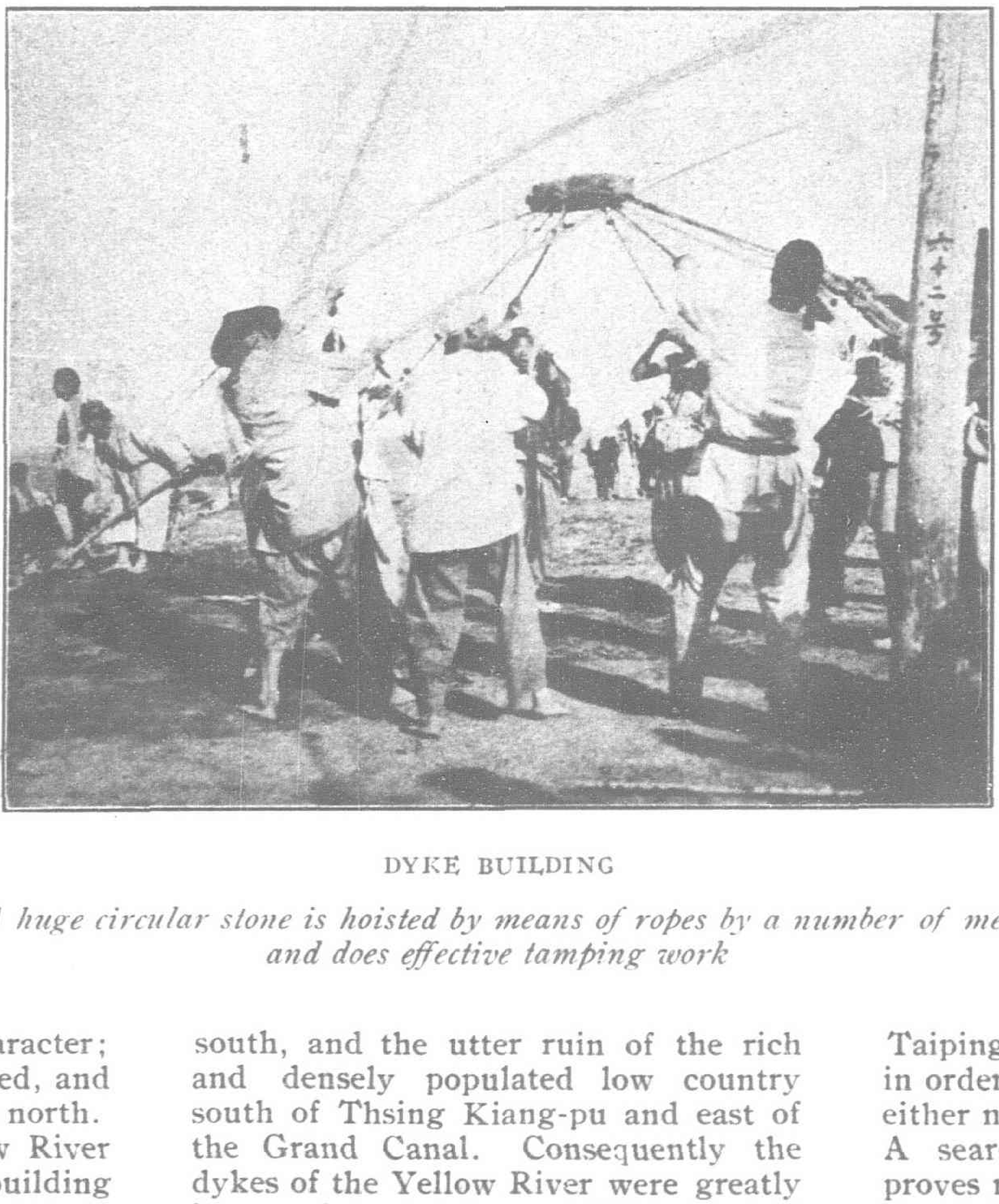
* This statement is not made as the result of personal observation, but from data given me by foreign missionaries and natives living in sections affected.—*C.D.J.*

A SHORT HISTORICAL SKETCH OF BOTH THE YELLOW RIVER AND THE HUAI, AND THE CAUSES WHICH LED TO THE PRESENT EXISTING CONDITIONS

From the most ancient times of which there are reliable Chinese records, say 2000, B.C., until 1324, A.D., the Huai River had a well-defined channel and flowed freely to the sea through the Hungtze Lake by what is known to-day as the old bed of the Yellow River. The Hungtze Lake at that time covered about one quarter of its present area.

Up to 1324, A.D., the Yellow River, with one temporary exception, had its discharge to the north of the promontory of Shantung, moving its actual point of discharge up and down this coast from the borders of Shantung on the south to Tientsin on the north, at times discharging through several mouths simultaneously.

The one exception was in 1100, A.D., when it broke its southern dyke near the point now crossed by the Grand Canal, and for a short time came south more or less along the line of the present canal, spreading ruin and death in its path and discharging a portion of its flood into the Yangtsze, breaking the canal dykes south of Thsing Kiang-pu, and spreading over the low country to the east. At the same time an immense flood in the basin of the Huai added much to the horrors of that year. This diversion of the Yellow River was, however, only of a temporary character; the break in its dyke was repaired, and it was once more confined to the north.



DYKE BUILDING

A huge circular stone is hoisted by means of ropes by a number of men and does effective tamping work

In 1324, however, the Yellow River having completed its continent building in North China for the time being, broke its southern dyke near Kaifengfu in Honan, and once more swept south, this time from the north-west, seeking a new channel to the sea. Several were tried during the next year or two, one by the Sha River into the Huai, then by the Ke River, then for a short time by a direct channel into the Hungtze Lake, until at last it settled down to one route, joined the Huai River just north of Thsing Kiang-pu, and with it passed into the sea in the original channel of the Huai, now known as the old bed of the Yellow River.

In time the immense amount of silt brought down by the Yellow River raised the bed of this channel to the height of the Hungtze Lake and more, and the floods of the Yellow River began to back up into the lake and the Huai. As the bed of the Hungtze Lake rose, its water spread over the country more and more, to the destruction of cities and towns on the northern and southern shores. Some of these cities were moved to more elevated sites, and others simply went out of commission.

The beds of the Hungtze Lake and Yellow River continued to rise, and the floods of the latter swept west as backwater in a most dangerous manner. The floods of the Huai were small compared with those of the Yellow River which must be controlled and confined. If it once forced its way into the country south of Thsing Kiang-pu it would mean the destruction of the Grand Canal from Thsing Kiang-pu south, and the utter ruin of the rich and densely populated low country south of Thsing Kiang-pu and east of the Grand Canal. Consequently the dykes of the Yellow River were greatly increased in height and thickness and faced with cut stone for some hundreds of miles, the famous Ming dyke was built, and the Huai River flowing into the Hungtze Lake was cut off from its direct outlet to the sea, and left to get out of the Hungtze Lake as best it could. The result of this is that when the heavy rains come the Huai has no way of passing them quickly on, and the water is held in the Hungtze Lake and backs up, flooding the country to the north-west. In time it passes away, partly by exfiltration in the Hungtze Lake and the swamp lands to the south-east, partly by evaporation, and partly through numerous small channels in the vicinity of Tsiang Kia-pa, leading east to the impassable barrier of the Grand Canal, and then south through the swamps and shallow lakes into the Yangtsze. A certain amount also passes directly into the Grand Canal by the Ching River.

The amount of water to be handled is so great that often the waters of one flood cannot pass away before the arrival of the next year's flood, and the average now is that the flood areas of Anhui are inundated at least three years out of five.

In 1854 the Yellow River once more went north of Shantung, after 530 years of hard work in the south, but its enormous dyke and raised bed still present an unsurmountable barrier to the free passage of the Huai River to the sea, and the high floods still continue.

In 1854, when the Yellow River changed its course once more to the south, the Taiping Rebellion was in full swing, and was laying waste the Empire south of the Yangtsze, and in many places to the north. The Imperial forces from the north were being hurried towards the south to stop the advance of the rebels. There were no railways. To meet the rebels the northern troops must come down the Grand Canal or march overland. The north dyke of the Yellow River to the west of Kaifengfu gave way, and the Yellow River poured its torrent of mud and water into this north country from the break to the sea. The Grand Canal was thus rendered useless, and from the mountains on the west to the sea was a barrier through which no troops or munitions of war could pass either way for some two years. There was much written at that time to prove that either the Taipings or Manchus cut the dyke in order to prevent the moving of troops either north or south, by land or canal. A search through these documents proves nothing either way, but certainly the dyke gave way, the country was inundated and no troops could pass, and all at a most opportune time.

THE WATER SUPPLY OF THE GRAND CANAL AND THE OUTLETS OF THE HUNGTZE LAKE

The main water supply of that section of the Grand Canal south of the border of Shantung and north of Thsing Kiang-pu comes from the Yi River. As has been said before, this supply is most irregular in amount. During the dry season, from November to May, the

Map
of the
Flood and Famine Region
C. D. Jameson Mem. Am. Soc. C. E.
American Red Cross Engineer.
SCALE 1 INCH = 22.25 MILES
indicates the Boundaries of the Famine, and Flood Region.
line of proposed outlets and Canals.
probable line of proposed outlets and Canals surveys not completed.
被災處
洩水河
洩水河尚未看測完全
KHAI-FÊNG
OLD COURSE OF THE YELLOW RIVER
SÜ-CHOU
(BEFORE 1852)
GRAND CANAL
TIEN-TSIN PU-KOW RAILWAY
HUAI HO
HUNG-TSÊ HU
HUAI-AN
YANG-CHOU
CHINKIANG
NANKING
YANG TZE KIANG
SU-CHOU
SHANGHAI
THAI HU LAKE
YELLOW SEA
OLD MOUTH OF YELLOW RIVER
Proposed outlet for the Huai river
Proposed outlet for the Yi river
Proposed outlet for the Shu river
Proposed diagonal canal
KIANGSU
NGANHUI
HONAN
PENG PU
FENG-YANG
LIN HWAI KUAN
HUAI-YUEN
WU-HO
SSU
SU-THSIEN
SUI-NING
TSING-KIANG PU
PAO-YING
KAO-YU HU
WU-HU
TSING-KIANG
KIANG-YIN
TCHANG CHOU
SUNG-KIANG
HI-THAI SHA
TCHUNG-MING

Yi River discharges but little water, not sufficient to keep the canal at a desirable depth. For a part of the time the larger cargo boats are unable to run, and even the smaller boats have to move slowly and with care, seeking the devious, narrow channel and avoiding the bars and shallows.

Much of the difficulty of navigation during the dry season is not due to the actual lack of water but to the entire neglect of any regularization of the channel, either as to uniform slope of the bottom or uniform cross section, and absolutely no work of repair or training has been attempted for years.

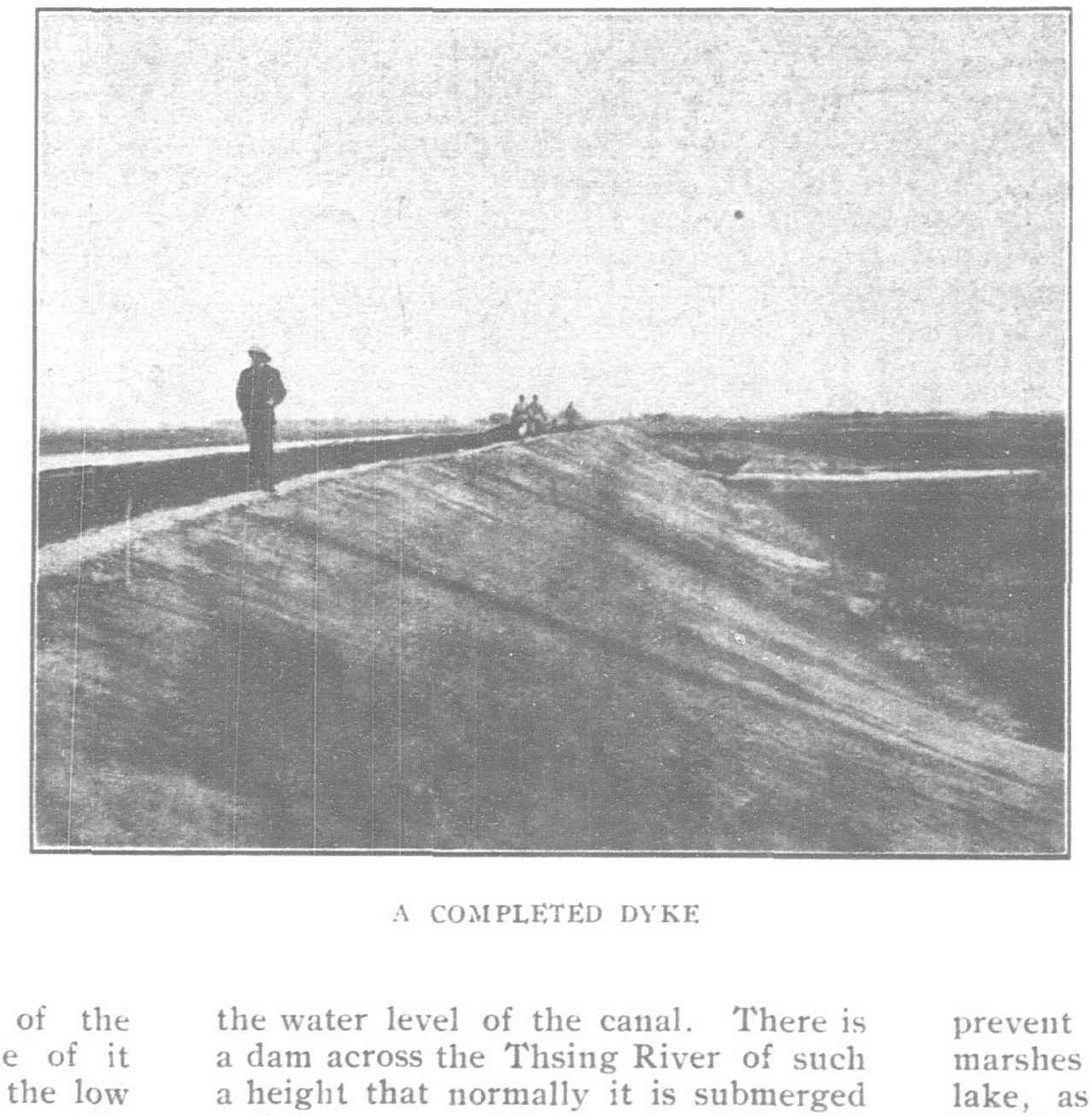
When the Yi River is in flood there is a superabundance of water: the channel changes from day to day, scour and deposit take place where they will, the dykes are broken or at least very much damaged, and in places the water spreads out to a thousand feet or a mile in width; the waste sluices on the east side are opened, and if these are not sufficient to control the flood the "pas" are broken away and the country to the east is flooded. A "pa," as the word is used here, is a section of the dyke constructed, not of well tamped sand and clay, but of millet stalks tied in bundles, and laid at right angles to the axis of the canal. These "pa" were originally fifty or a hundred feet in length, and in the low country to the east there was, at least in theory, a suitable canal to receive the water. When the flood reaches a certain height and is still rising, in spite of the fact that all the permanent waste sluices are open, a few bundles of the millet stalks are removed from the centre of the "pa" to a depth sufficient to allow a small opening for the water which quickly does the rest. The entire temporary bank is speedily torn out, usually with some hundreds of feet of the permanent dyke on each side of it as well, the water pours into the low country, and the canal, to a certain extent, is saved. Saved, however, at the expense of the low country, as any channels which may once have existed to receive the overflow have long since silted up.

When the flood subsides and the banks and "pa" are repaired, millet stalks alone are used, being much cheaper than a well built dyke of earth, and the consequence is that some of the "pas" are now a thousand feet in length and are carried away by very moderate floods, to the great damage of the low country and to the canal itself.

The northern section of the canal may be said to finish near Yang-suan and the southern section to commence south of the lock at Thsing Kiang-pu. That section of the canal between these two points may be considered a regulating section for the regulation of the amount of water to be admitted to the southern section of the canal. Both north and south of Yang-suan are waste sluices which discharge into the Yen-ho, which in turn discharges into the sea beyond Haichow.

The Yen River, or, to give it its full Chinese name, the "River for the transport of salt," is not a river but an artificial canal constructed for the transport of salt from the sea coast to Yang-suan in small boats, at which point it is transhipped into large boats, some of which are sent north up the canal, and many across the Hungtze Lake and up the Huai River, to be distributed through the entire Huai basin.

Near Matou is the so-called Thsing River, branching off from the canal and running either to or from the Hungtze Lake according as to whether the water level of the lake is lower or higher than the water level of the canal. There is a dam across the Thsing River of such a height that normally it is submerged and the waters of the canal or lake pass freely over it, but in the case of extreme low water in the lake this dam is of sufficient height to prevent the draining of the canal below a minimum level.



A COMPLETED DYKE

Beyond the opening of the Thsing River towards Thsing Kiang-pu are three so-called locks, situated about a mile apart, and at Thsing Kiang-pu is another lock. The three sluices have a clear opening of only 23 feet in width. Vertical grooves are cut in the masonry for the reception of timber balks, by means of which the water level in the pools below them may be raised some seven feet above low water, thus creating sufficient depth of slack water for the passage of cargo boats, and also when necessary for the closing of the canal to excessive overflows from the Hungtze Lake through the Thsing River when the lake is in flood. Through these locks passes all the water from the Hungtze Lake and the Huai River which finds its way into the Grand Canal, though they have openings of only 23 feet in width, and in flood time a depth of water not exceeding ten feet.

The canal from Thsing Kiang-pu south is amply provided with waste sluices in the east dyke for the passage of any excessive amount of water.

TSIANG KIA PA.

The Grand Canal cannot in any way be considered an outlet for the waters of the Huai River and the Hungtze Lake. The real outlet of the Hungtze Lake and consequently of the Huai River is through the so-called five canals from Tsiang Kia pa on the south-east side of the Hungtze Lake, running east to the marshes and lakes extending south to the Yangtsze River along the west side of the Grand Canal. These canals are some 500 feet in width and 8 feet in depth, and as defined canals they are only some six miles long, extending from the lake east. At this point they merge into shallow lakes and marshes, and only a small clear channel is maintained at Tsiang Kia pa on the lake. Four of these canals are closed by earth dams, and except during the excessive floods all the water carried off at this point passes through one of these canals. In times of excessive floods the four dams are cut successively, and as many of the canals used as are found necessary. During the dry season the water level of the lake falls to such an extent that an earth dam is built across the entrance to the canal usually kept open, to prevent the water of the lakes and marshes from draining into the the lake, as it is advisable to maintain a sufficient depth in this canal to allow of the passage of boats to and from the Hungtze Lake. The passage is effected by the opening of a moveable section built into the earth dam, and pulling the boat up the incline of water from the lake by means of ropes or windlasses, or allowing it to slide down into the lake, in the same manner as boats pass the locks in the canal north of Thsing Kiang-pu.

THE FLOODS IN THE SECTION NORTH OF THE OLD BED OF THE YELLOW RIVER AND EAST OF THE GRAND CANAL.

This section extends from the sea to the dykes of the Grand Canal, and from the north dyke of the old bed of the

Yellow River to the hills and mountains of southern Shantung, the Grand Canal cutting off all the waters coming from the west, with the exception of the waste waters of the Canal itself.

The river systems are the Shu and Yi, which have already been described. These both come from the north, having their sources in the mountains of southern Shantung. The Shu discharges all of its waters into this flat plain, the Yi all of the water not used to feed the Grand Canal. In addition to these two natural rivers there is the artificial canal, the Yen River, running from the point north of the old bed of the Yellow River near where it is crossed by the Grand Canal to the sea beyond Haichow in the north-east, a distance of 100 miles. The Lui-tang-ho crosses the Yen-ho at Pampu, flowing eastward to the sea. This whole section is a network of canals, crossing and recrossing in every direction. Which are artificial and which natural it is now impossible to determine. The tide from the sea comes up all of these waterways for a distance of some fifteen or eighteen miles. None of these waterways receives any care, and judging by appearances and available local information the channels are never cleaned out.

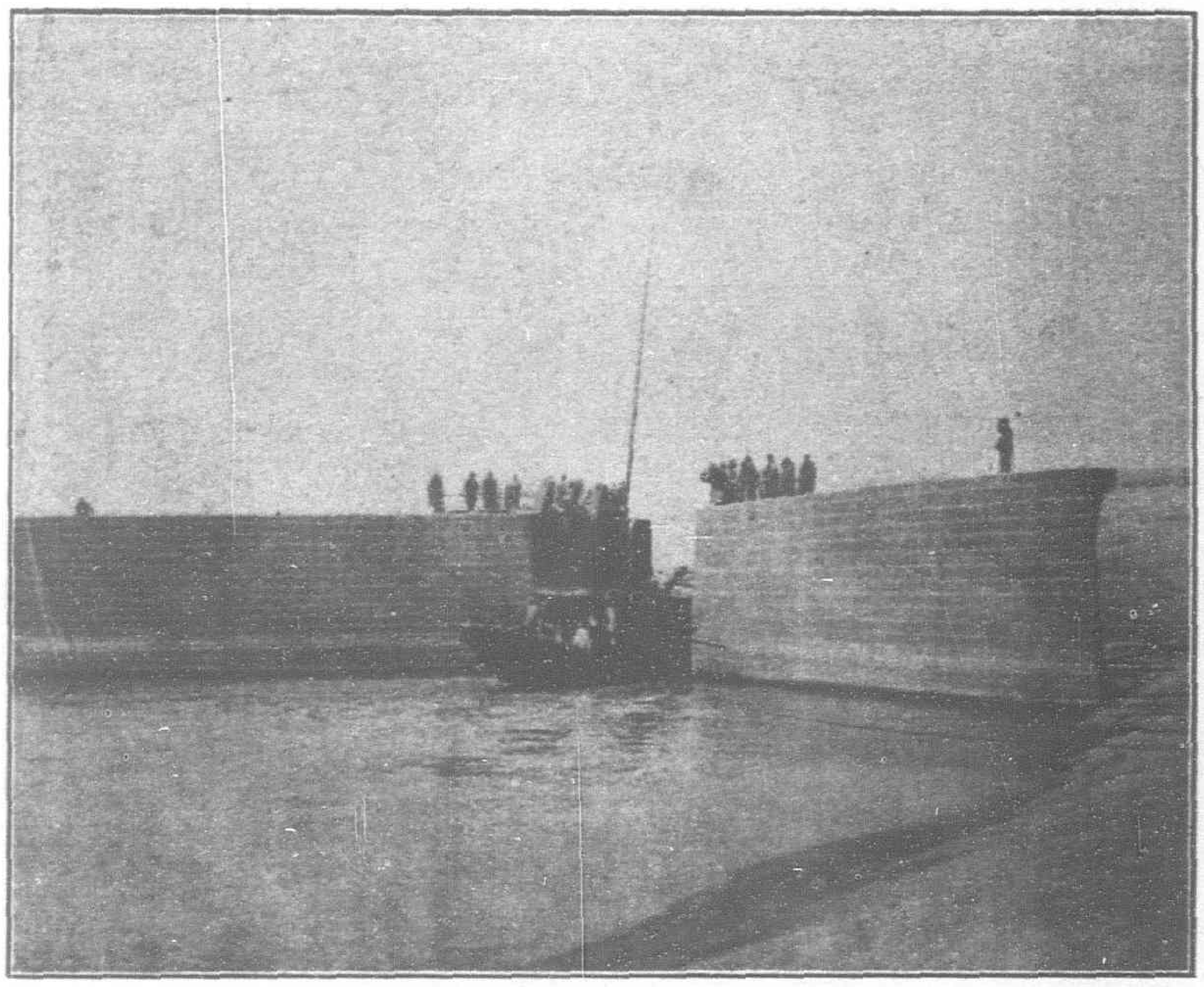
As is always the case with waterways through an alluvial country, the lower reaches are silted up, and in many cases the bed at the lower end is higher than in the intermediate sections. This is clearly shown on the profile of the Yen-ho, where the bed near the sea is some six feet higher than the bed fifty miles further up the river. This is also shown on the profile of the Lui-tang-ho.

This silt deposit is also greatly accelerated by the action of the tide, the incoming tide having the effect of creating slack water or a slight reverse flow, giving the fresh water a chance to free itself of much of its burden of silt, while the ebb tide does not create a velocity of discharge sufficient to scour the bed, pick up this deposited silt and carry it on to the sea.

The water level is but a few feet below the natural surface, and the floods of the Shu and the local rainfall cover the whole northern section. The flood waters of the Yi escaping into the old bed of the Loma Lake, flooding that, and the flood waste from the canal to the east, with the local rainfall, completing the flooding of the region to the old bed of the Yellow River.

The greater portion of this flood is due to the fact that no defined outlets with adequate points of discharge have been provided by nature, and no artificial remedy of this apparent oversight of nature has as yet been systematically attempted by man.

This apparent oversight of nature is really no oversight at all, if we consider that the object of the work being done by these natural forces is to build up the country by means of silt deposits. The whole area which has been under examination is an unfinished country. All the natural forces are hard at work building it up to a point when it will be habitable for man without artificial restraint being put upon the natural forces. But man would not wait until nature had finished her work. He moved in and took possession several ages too soon, before there was a well drained cellar, before the floors were laid above the water level and even before the roof was finished. The result is that if man will move into an unfinished section with all its discomforts he must make the best of it, and pit his intellect against nature, tame these forces and make them work for him.



GRAND CANAL LOCK

This lock is one of the outlets of the Huai River at Thsiang-kiang-pu, the passage way being 23 feet wide

PART II

A Description of the Work to be done to Lower the Flood Level and Drain the Marshlands and Shallow Lakes in the Flood and Famine Region of the Northern Portions of the Provinces of North Anhui and North Kiangsu.

It must be understood in all that is said in this Report as to the lowering of the flood level and the practical elimination of the floods, that it applies to normal floods, such floods as occur every few years, or year after year in some cases, destroying the crops and impoverishing the people. Such floods, and consequently the damage done by them may be done away with, but at times there comes an abnormal flood or cataclysm, which sweeps before it any work of man. Such floods cannot be eliminated, but there is always the chance that such horrors may never arrive.

The Yellow River

It may be remembered that amongst such monstrous calamaties must be reckoned the possible breaking of the southern dyke of the Yellow River and the pouring of its devastating floods of mud and water over the region under consideration. If this break should occur and the Yellow River once more come south of Shantung, the conditions governing the conservation system of this region would be radically changed, and after the immediate deluge was over there would be entirely new problems to solve.

The Sea Coast from the Old Bed of the Yellow River to Haichow.

As all the waste waters of the area north of the old bed of the Yellow River and east of the Grand Canal, together with much of the discharge of the Huai River must eventually flow into the sea at various points between the old mouth of the Yellow River and Haichow, one of the most important and one of the first pieces of work to be done is a complete survey of this section of the sea coast, the survey to be both topographical and hydrographical.

At present no charts of any value exist of this section, and none on which the soundings are correct. All sandbars, shoals, etc., shown upon existing charts of this coast are either works of the imagination, or any actual soundings recorded were taken so many years ago that nothing can be said of them beyond the fact that they are known to be incorrect at present. Of course the great reason that no accurate charts exist of this portion of the coast of China is due to the fact that there are no harbours available for sea-going vessels, and that the coasting steamers plying between existing ports such as Shanghai and the ports to the north, follow the shortest routes, and thus pass many miles to the east.

A chart should be made of this coast showing the depth of water, direction and force of any ocean currents, direction of prevailing winds, drift of the sand, rise and fall of the tides, etc., etc. This work should or might be done by the Coast Survey Department of the Chinese Maritime Customs, and they would undoubtedly undertake it if the value and necessity of the work were officially brought to the notice of the Inspector General.

The object of this survey would be to make possible the selection of the most suitable points for the discharge of the waters which now flood the back country.

This entire area is an unbroken alluvial plain, and the cost of constructing new channels to the sea or enlarging any of the existing ones would be practically the same wherever located; therefore in locating these channels the question of difference in cost may be eliminated.

The great point, and practically the only essential point upon which too much study and care cannot be expended, is the location of the points where these channels shall discharge into the sea, the best location being at those points where the configuration of the coast, the prevailing winds, the existing currents and the depth of water all combine to allow of the maximum discharge of water with a minimum cost of artificial works and a minimum cost of maintenance. These questions cannot be answered until the coast, both land and water, has been thoroughly surveyed, and all this necessary information is available.

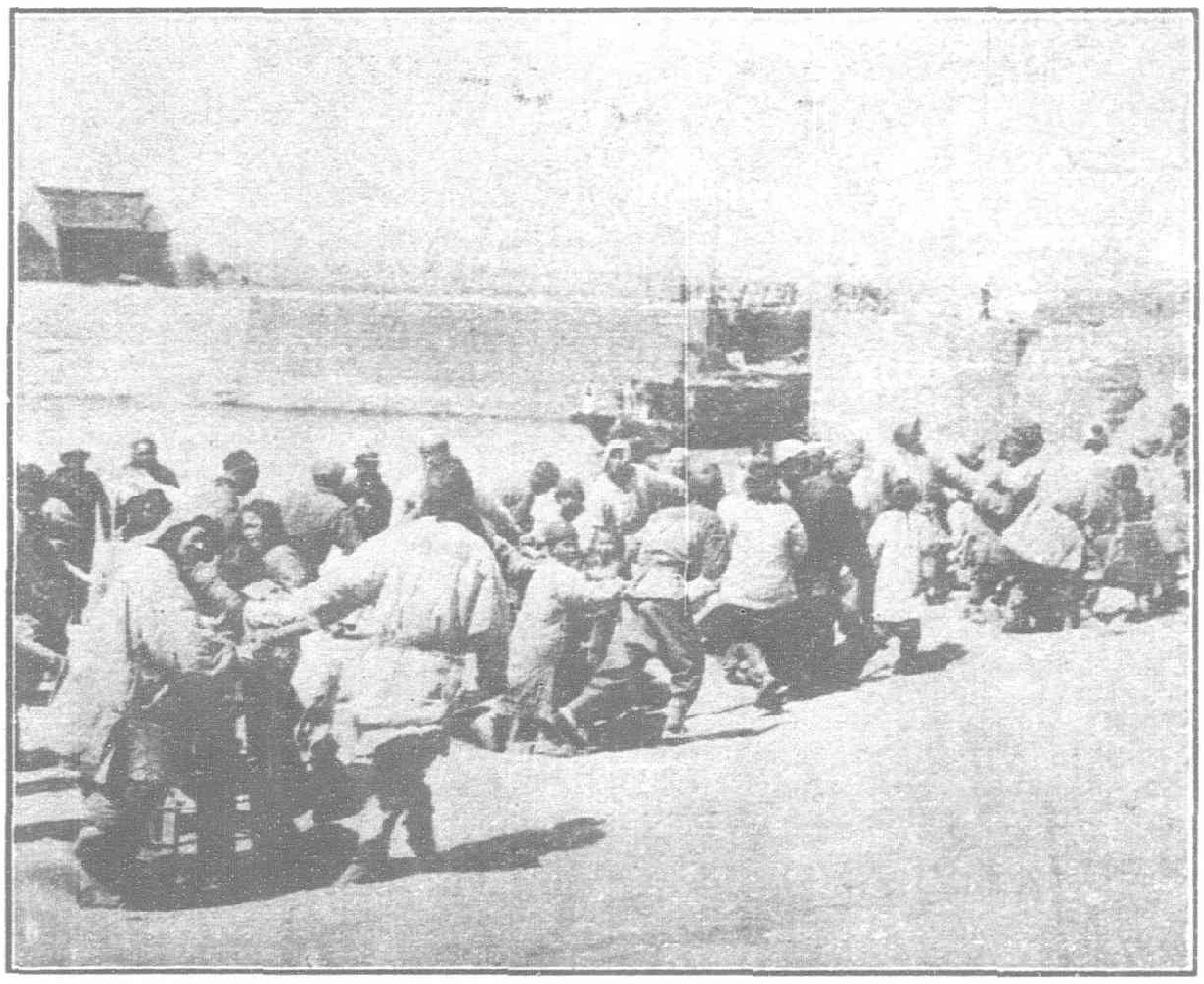
The more water that can be discharged at these selected points the less there will remain to be taken care of by other and more expensive means, and the less will be the initial cost of the drainage and conservancy work, and the less will be the cost of maintenance.

THE SHU RIVER

This is a flood river discharging but little water during the dry season, but much in a very short time during the rainy season. No records of the actual discharge will be available until November, 1912. After leaving the mountains of Shantung and reaching the alluvial plain, this river has now one well defined channel to the sea, but many indefinite ones. The water is divided and spread out to such an extent that it has not sufficient velocity to keep a channel clean. The channels are more or less blocked by the growth of aquatic plants, which tend to retard the flow of water, spread it over the country, and year by year increase the marsh sections. Some definite channel to the sea should be selected, the shorter the better, other conditions being equal, and this channel cleaned, deepened and made of sufficiently large uniform cross section. The channel should be excavated below the level of the country, and whether or not it should be protected by dykes is a question for further study. All side outlets or inlets should be protected by regulating sluices, so constructed as to cut off all flow of water either way when necessary, these outlets or inlets being used either to drain the adjacent land or irrigate it according as the necessity might arise.

The river need not be considered from a navigable point of view, as it is only used by small boats during a few months of the year. As the water is low in the river the greater part of the year, some inexpensive form of moveable dam may be necessary to raise the water level sufficiently for irrigation.

If flood dykes are necessary the flood channel need not be cut much, if any, below the surface of the country. The dry season channel should, however, be cut well below the surface level and kept midway between the flood dykes.



WORKING A LOCK

This view illustrates the method adopted to haul a Junk through a lock. Wire ropes are attached to the Junk and are wound on windlasses by the country people

In no case should it be allowed to impinge upon them and wherever a tendency is shown by the channel to work towards either dyke it should be stopped at once, and if taken at the start a river can usually be trained to hold its proper course at comparatively little expense. The great reason why the low water channel should be kept away from the dykes is that when a rise begins, and before the low water channel is overflowed, the water being confined and relatively deeper has greater velocity, and is capable of doing more damage. As the water rises and spreads out to the flood dykes the velocity decreases at the sides, and is less when the dykes are reached, increasing, however, as the depth increases; but by this time the water is above the toe of the dykes where the greatest danger of damage is, and the flood may be controlled with a minimum of danger to the dykes.

THE YI RIVER

The problem of the Yi River is entirely different from that of the Shu.

The Yi River rises in the mountains of Shantung, and after reaching the alluvial plain of North Kiangsu divides into some five channels, all of which discharge into the Grand Canal, the most southern of these points of discharge being at the village of Yao-wan. This is a flood river similar to the Shu, but unlike the Shu it is an important feeder of the Grand Canal, and thus becomes an important factor in the maintenance of the Canal.

At present its floods are in no way controlled and do much damage each year, flooding large areas in the Pichow district, causing the loss of crops and also destroying the dykes of the canals in many places. This breaking of the dykes tends much towards lowering the water level in the canal during the dry season, much to the detriment of navigation. The bottom of the canal is not above the surface level, but when the dykes are in repair the water level is often higher than the swamp lands to the west.

The only outlet for the Yi under normal or low flood conditions is the Grand Canal, with the result that the western dyke of the canal is broken in many places, and the flood waters sweep across the canal and into the marshland beyond.

With heavy rains in the mountains of Shantung the river rises with great rapidity. In October, 1911, the river then running half full rose over twelve feet in a few hours, and flooded the village of Yao-wan. The western dyke gave way, and the country on both sides of the canal was flooded for miles, both north and south of Yao-wan, and many persons were drowned.

When the water has reached a certain height a small amount of relief is given by an overflow into the old and now normally dry bed of the Loma Lake, lying to the south and west of Yao-wan. This old lake bed is some ten miles wide east and west, and fifteen north and south. At one time it was a depression receiving the water of the Yi and discharging to the south, probably for some distance along the line of the present canal. The bed of the Loma Lake was gradually raised by silt deposits and is now dry, excepting in high floods of the Yi, when a portion of the water passes into it through a small but ill defined channel.

To do away with the flood evils of the Yi River the following work should be done:—

A well defined channel for the Yi should be cut through the Loma Lake bed and continued to the sea, probably by the enlargement of some existing channel. This channel through the lake bed should be kept as high near the side of the basin as is compatible with sufficient fall to carry away the water, in order to be of use for irrigation when necessary.

Whether the five channels by which the Yi now discharges into the Grand Canal should all be maintained or not is a question to be determined after a more detailed study and survey have been made of the existing conditions than has yet been possible. This future study of the conditions, however, will only determine what outlets are necessary for the proper irrigation of the section through which they pass, and the proper supplying of the canal with water. But whatever number of outlets are found necessary, each of these outlets should have a regulating headwork at the point where it leaves the main river. There should also be a regulating headwork across the flood canal through the Loma Lake at the point where it leaves the main river, and also one across the main river just below the opening into the flood canal.

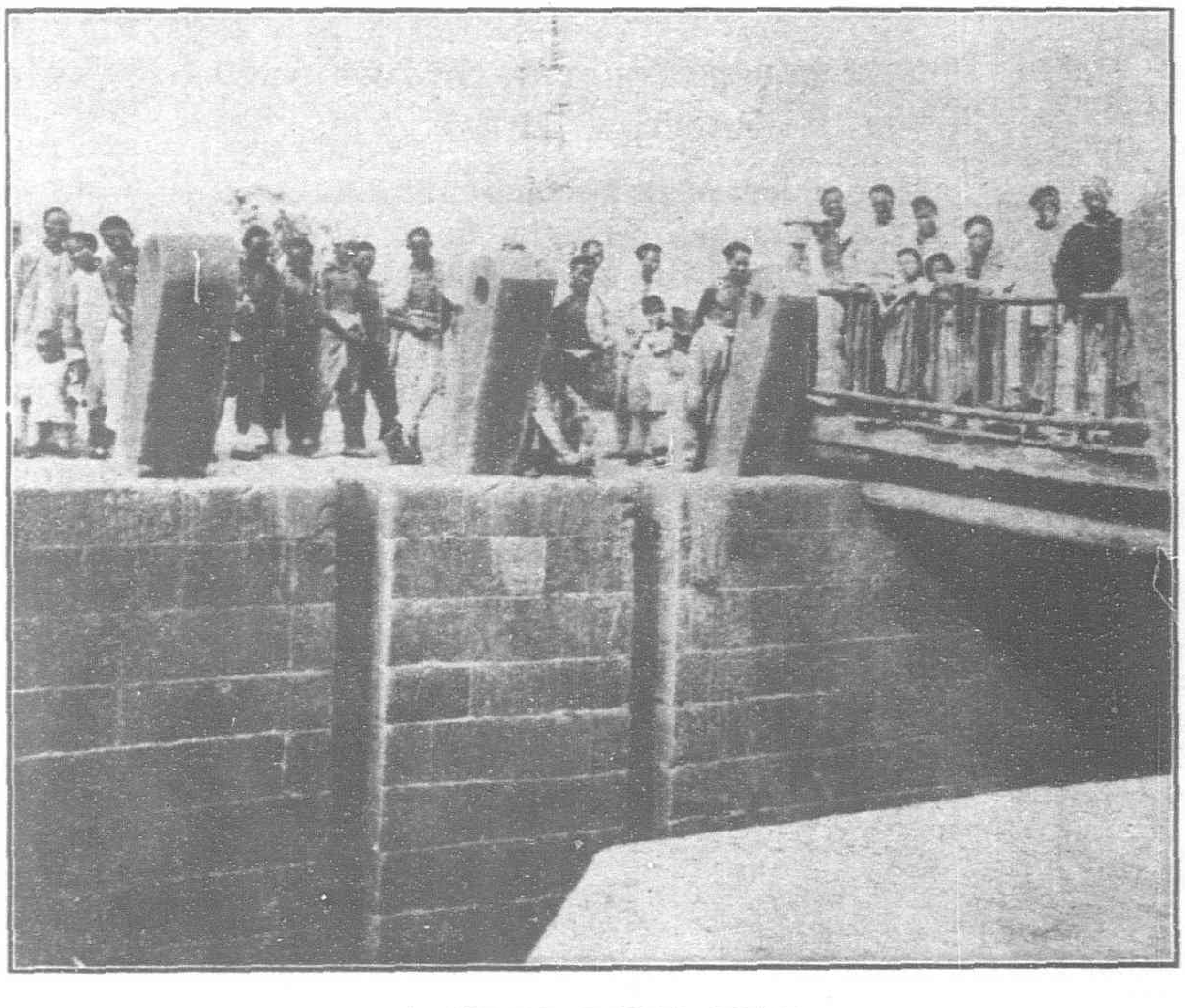
These headworks should be worked as follows:—

During the dry season the channel to the Loma Lake should be kept closed, unless it be deemed advisable to pass a certain amount of water down it for irrigation purposes. The water passing into the Grand Canal for the purpose of maintaining its water level could pass through any or all of the outlets, the continued maintenance of which a careful study of the conditions had shown to be advisable. The maintenance of some of these outlet channels into the Grand Canal would depend upon the needs of the section for irrigation, and if but a small amount of irrigation is necessary there would be but one river channel, with the others merely irrigation ditches having small regulating sluices. But however the details may work out upon a careful study of the conditions, the result will be that during the dry season all the available water can be utilised when and where it is most needed with a minimum of waste, and during the rainy season the sluices to the Loma Lake can be thrown open and the greater proportion of the water passed out that way, and by means of the regulating works at the inlets of the channels leading at the Grand Canal no more than the desired amount of water will reach the Grand Canal, and thus the breaking of the canal dykes and the flooding of the country will be done away with.

The Loma Lake channel should be made of ample section and cut well below the surface level. With a properly designed channel through this lake with an ample free outlet to the sea there will be but little danger of serious floods.

All of these channels must be well maintained, kept clean, clear of vegetation, with well defined banks and uniform cross section. The water should be confined and not permitted to spread over the country, making the land sodden, and tending each year to increase the area of the shallow lakes and marshes.

With well defined outlets to the sea, the water level of this whole section north of the old bed of the Yellow River and east of the Grand Canal can be lowered to such an extent by judicious ditching as to make possible two crops each year, this ditching to be done by and at the expense of the landowners, but entirely under the direction of the Chief Engineer of the Conservancy Board.



A GRAND CANAL LOCK

The grooves in which the timber baulks are placed to raise the water are here well shown

THE HUAI RIVER AND THE HUNGTZE LAKE

The Huai River and the Hungtze Lake will be considered as one in the general scheme of conservancy and reclamation.

The Huai River rises in the mountains of Honan and discharges into the Hungtze Lake. Its tributaries and catchment basin have been described. The two most important tributaries, the Sha and the Ke have their sources near the Yellow River, the Sha to the west of Khaifeng-fu, the capital of Honan, and the Ke to the east of it. Both of these rivers have a navigable depth of about two feet to within about thirty miles of Khaifeng-fu. From this point the land is one large marsh, traversed by many small indefinite channels. The waters of these rivers, even in extreme floods, carry but little silt, and aid but little in continent building. The Huai, itself coming from the far off mountains of Honan, contains much more silt than these rivers, but still very little when compared with the Yangtsze and the Yellow Rivers.

DISCHARGE OF THE HUAI RIVER

On the south-west side of Huai-yuan there are two considerable mountains between which the Huai River passes. To the west of this pass is a long stretch of flat country with mountains and highlands to the south, and very gently rising land to the north. Across this stretch of some six miles in length the river has a most winding channel which about doubles its length. With any considerable rise the whole section is flooded and the wheat crop lost. Much of this flooding can be done away with by straightening and confining the channel. As it is, however, there are no hamlets in this section, the whole of it being in the hands of large landowners. Therefore the loss, when it occurs, is only that of the crops, and small farmers and small villagers are not affected.

From Huai-yuan east is that portion of the Huai River requiring the greater part of the work of improvement and regulation.

The Huai, discharging into the Hungtze Lake, which has no adequate and definite outlet, cannot dispose of its waters with the rapidity with which these waters come down from the north and west during the rainy season. The first problem, therefore, to be solved in any betterment scheme for the Hungtze Lake and the Huai River is the providing of one or more adequate outlets for the lake.

There are two possible directions in which the waters of the lake may be drained. It may discharge into the sea to the east or into the Yangtsze River to the south. Owing to the great discharge of the Huai during the floods it has been considered wise to utilise both of the possible points of ultimate discharge.

The outlet to the east would leave the lake at or near the mouth of the Thsing River. The actual location of the ocean mouth cannot be decided upon until the hydrographical survey of the coast has been made, but under no circumstances should the channel of this new outlet be located south of the old bed of the Yellow River.

The reasons are :—

(*a*) That the country south of the old bed of the Yellow River and east of the Grand Canal is lower than the land either to the north or west, and has a lesser rate of fall to the sea.

(*b*) This entire section is densely populated and brought to a high state of cultivation, being one of the richest agricultural sections of China.

It being much lower than the country to the north and west it is always on the verge of destruction and ruin from inundation. Its defences, with the greatest care and watchfulness, are only just able to avert disaster from the many forces which now threaten it, and the opening up of a new channel through it of sufficient capacity to carry one half of the great flood discharge of the Huai, would add a tremendous menace to the future of this section.

It must be remembered, however, in designing and executing and protective work against floods, that some cataclysmic flood may come which no justifiable work of man can withstand, and if a new channel for the Huai were cut through this section and the crash came, the loss of life and property would run into millions, taels and human lives; therefore almost any increased amount in the cost of the work would be justifiable to keep the proposed new channel in or north of the old bed of the Yellow River.

Even if in years to come the Yellow River shifts its channel once more to the south of Shantung by a break either near Khaifeng-fu or near where it is now crossed by the Grand Canal, there is a strong possibility that the resulting deluge would get to the sea without breaking into the low (Hia) country, the old dykes of the Yellow River and the Ming embankment serving as buttresses against which it might expend its fury in vain.

The country north of the old bed of the Yellow River and east of the Grand Canal is also a low, flat country, full of canals and watercourses. From the north it receives and will continue to receive all the flood water of the Shu River, and when the conservancy work is completed there will be a large addition to the flood waters of the Yi River. These, with the water due to its own rainfall will give it about all the water it can get rid of. Therefore, unless it is absolutely necessary, no more water should be added to this region.

For all of the above given reasons the turning of the floods of the Huai River into the low country, either to the north or to the south of the old bed of the Yellow River would be a grave error, if some other channel is available. The one available, and in many ways most desirable, is the old bed of the Yellow River itself. The gigantic dykes which would serve as flood dykes are still in existence and in fairly good condition. Between the dykes the surface level is considerably above the surface of the adjacent country, thus making possible the excavation of the entire channel for the Huai River, below the land surface. All the land between these dykes is Government property, thus eliminating the cost of purchasing new land for a right of way, and all troubles with native landowners. The width between these old dykes is so great that even in the event of abnormal floods the water could not inundate the country.

The conditions of the old mouth of the Yellow River at the sea will not be known until the results of the hydrographical survey are available. There is, of course, the possibility that during the last fifty-eight years the ocean currents may have swept away much of the deposit of the Yellow River. However, it is not absolutely necessary to use this old mouth, as the new channel, when near the sea, can pass through the old dyke to the north and discharge into the sea at any desired point.

THE DRAINING OF THE SWAMPS AND SHALLOW LAKES

The object of this conservancy scheme is not only to lower the flood level of the Huai and the whole north country, but also to drain the thousands of acres of land now swamps and shallow lakes. These thousands of acres of exceedingly rich land are now not only useless as far as any returns are made to the people, but are worse than useless in the barrier they form to the rapid subsidence of the floods, and cause an annual increase in the acreage of swamp lands.

THE LAKES AND SWAMPS WEST OF THE GRAND CANAL AND SOUTH OF THSING KIANG-PU AND THE THIRD OUTLET FOR THE HUAI RIVER.

The lakes and swamps west of the Grand Canal and to the south of Thsing Kiang-pu, together with the second outlet for the Hungtze Lake and the Huai River will now be considered.

Other than through the small locks into the Grand Canal north of Thsing Kiang-pu, the only present outlet for the Hungtze Lake consists of the five artificial, so-called canals, all more or less well defined, starting from the south-east corner of the lake at Tsiang Kia-pa and running east through swamps to the lakes extending south three-quarters of the way to the Yangtsze, on the west of the Grand Canal, the Pao Ying-hu, Kao-yu-hu, Shao-pu-hu, etc. An ample canal should be made from the lake at Tsiang Kia-pa towards the east, then swinging round to the south and connecting all these lakes, with an ample outlet into the Yangtsze. The depth of the canal should of necessity be such that not only would it serve as an additional outlet for the Hungtze Lake and the Huai River, but it would drain these smaller lakes and all the contiguous swamps and marshes, thus making available for agriculture not only thousands of acres of rich land now useless, but also insuring a regularity of crops on thousands more acres by proper drainage and elimination of floods.

As these lakes, the Kao-yu-hu, etc., are on a level with the canal at its southern portion and in connection with it, their partial or complete drainage and the lowering of the water level of the section will necessitate changes in this portion of the Grand Canal itself.

THE DRAINING OF THE COUNTRY NORTH OF THE HUAI RIVER: YUNG-TCHENG, NAN-SUCHOW, LING-PI, SZE-CHOW AND SUCHOW-FU.

There are no large rivers in this section, but a sufficient number of small ones to amply drain the country if the channels were properly cleaned and regulated, and suitable outlets provided for them. No heavy and expensive work would be required here for the drainage of this section. What is needed more than anything else is the cleaning and regulating of the existing channels. They have all become more or less choked with water plants, the dykes have broken in many places, and with a small rise the water spreads over the country in shallow lakes instead of running off in a proper channel ; the ground becomes sodden, seed cannot be planted nor the ground utilised in any way. The result of this is that the marsh land is increasing in area each year, overgrown with rushes and marsh vegetation. The local rainfalls, which are often very heavy, cannot run off, and must simply sink into the ground or pass away by evaporation. This process is so slow, however, that the water of one rainy season is often still on the ground when the rains of the following year arrive.

All of these channels should be thoroughly cleaned and regulated throughout their entire length and in many places straightened, the dykes rapaired, an ample outlet provided and the rivers confined to their proper channels.

After the main work of the conservancy, this secondary work should be laid out by the Engineer in charge of the section, and much of it should be carried out by the local gentry at the cost of the towns and areas benefited. All reeds should be cut on the marshes to let in the sun and wind, with the exception of sufficient reeds actually needed for fuel.

With but little heavy work this entire section of country can be well drained, the outlet being in the lower reach of the Huai somewhere east of Wu-ho, the Kui, Pa-kou and Wei Rivers being made the main arteries of the system, and possibly the channel of the Sui River may be utilised. None of the water of this region should be allowed to flow east to the Suining and Sochien districts, but should be turned south into the Hungtze Lake or the Huai River.

The Lakes and Swamps West of the Grand Canal and North of the Hungtze Lake.

All of the lakes swamps west of and more or less adjunct to the Grand Canal as far north as the Shantung border should be connected with definite, clean adequate channels, and drain into the Hungtze Lake from the north.

The canals for draining the swamps and lakes of this region will not require large cross sections, as they will not be used for navigation other than by very small boats.

It must be remembered that all the canals for the drainage of this section must be cut well below the surface of the ground, that the channe's must be well defined and as straight as possible, the banks properly guarded by dykes where necessary, and the channels kept clean and of uniform section, when the passage of the water itself after rain will cause sufficient erosion to keep them so.

The Szechow and Wu-ho Region.

From Szechow south flows a small river navigable by ordinary native boats for the greater part of the year. The source of this river is considerably to the north and west of Szechow, and is probably near the channel of the Pa-kou-ho north of Ling-pi. It might be desirable to utilise this small river, which on the map goes by the name of Tho-ho, as a channel for the Pa-kou-ho and the Sui-hi into the Hungtze Lake, through the lower reaches of the Huai River. The channel would require straightening and cleaning. At present this river near its outlet turns sharply to the west, runs six or seven miles, and passes into the Huai River at Wu-ho. There is a small channel near the elbow through which a certain amount of high flood water passes to the south-east and into the lower reaches of the Huai River, some ten miles west of Wu-ho. This channel could be enlarged and made the main channel for the outlet of the river. By so doing not only would the fall in the river be increased and consequently the channel made more easy of regulation, but it would afford drainage for many thousands of acres of land north, east and west of Wu-ho, which is now under water some seven months each year.

This concludes the general design for the lowering of the flood level, the drainage, reclamation and betterment of the so-called Flood and Famine Region of North Anhui and North Kiangsu, viz:—

The Shu and Yi River systems.
The Huai River system.
The Hungtze Lake

and the drainage of the swamps and shallow lakes in this region, including the lakes and marshes west of and adjacent to the Grand Canal, from the southern border of the province of Shantung to the Yangtsze River.

The Hungtze Lake is to have an outlet towards the east, approximately along the line of the Thsing River, and down the old bed of the Yellow River to the sea, the actual point of discharge into the sea to be located after the hydrographical survey of the coast has been made.

The second outlet will be east through the Tsiang Kia-pa, then south through the lakes Pao-ying, Kao-yu, Shao-po, etc., to the Yangtsze, the whole section under consideration, with the exception of the Shu and Yi River systems, draining into the Hungtze Lake.

Of the two new outlets of the Hungtze Lake that to the sea in the old bed of the Yellow River will be practically all new work. The outlets through Tsiang Kia-pa and the lakes to the south will be small channels connecting these large bodies of water, and the primary object of all these canals will be to carry away quickly all the flood waters of the Huai River system and the section north of the Hungtze Lake. This flood water comes from the west down the Huai River, and also from the north-west from the Khaifeng-fu region, and as far north as the present bed of the Yellow River, reaching the Huai through to the Sha and Ke Rivers or the Hungtze Lake, through the Wei, Fei, Pakou and other small rivers.

East and West Flood Canals.

In the time of abnormal floods it is found that the cause is often a heavy rainfall in the mountains of Honan and in the section north of the Huai River simultaneously, and that the water coming from the north and from the west is all poured into the critical section of the Huai at the same time, thus causing much flooding and damage. In order to obviate this to some extent, that is to prevent the flood from the west and flood and from the north reaching the Huai River east of Huai-yuan at the same time, a canal may be necessary, running more or less east or west, beginning at some point east of Tchen, passing to the north of Ku-yang and carried east until it discharges into Hungtze Lake or the lower reaches of the Huai River. This canal would cross all the watercourses in this region, and should have sufficient fall to carry the water coming into it from the north to the Hungtze Lake.

The effect of this canal would be as follows. Supposing a flood to come from the west and from the north at the same time. Much of the water from the north would be caught in the canal, carried east, and disposed of without entering the congested portion of the Huai River, which could then accommodate the flood from the west with ease.

In building this canal proper regulating gates should be built wherever a natural watercourse is crossed, by which the water coming from the north may be passed down the natural watercourse or along the canal as may be thought best. In the case of heavy floods as much water as possible would be forced along the canal and reach the Hungtze Lake below the congested portion of the Huai River, thus leaving the Huai more free to carry the flood from the west. In the case of floods from the north only, the gates could be opened and each watercourse used to its safe maximum capacity, the balance passing along the flood canal.

With a suitable flood canal and regulating gates, much could be done to regulate the floods and lower their level.

The flood canal would be the last factor in the conservancy scheme. It should not be constructed until a careful study of the floods had been made for some years, and the effects of the outlets of the Hungtze Lake and the Huai River noted. There is, of course, a great probability that after reliable data has been obtained and the improvements in the Huai River and lake regions have been completed, this flood canal may not be found necessary. But only careful survey of the conditions and future results of the improvements can answer this question.

If the flood canal is constructed care should be taken that by means of proper sluices on its south side it would be possible, when necessary, to irrigate the country to the south.

The Working out of the above Scheme of Conservancy and Reclamation.

The first thing is the hydrographical survey of the sea coast from the old mouth of the Yellow River to Haichow, to determine the most suitable points of discharge for the Shu River, the Yi River and the new outlet to the Hungtze Lake down the old bed of the Yellow River.

The Shu River.—With regard to the Shu River there appears to be no necessity for control or regulating works beyond small sluices controlling the entrance of the drainage canals. The main features of the conservancy of the Shu are to give it a clean, well defined channel to the sea, and to see that this channel and its mouth are not allowed to silt up. The channel should be excavated sufficiently below the land surface to drain the country and swamps through which it runs.

The Yi River.—With regard to the Yi River its natural outlet is by the Grand Canal to which it supplies water. The new flood channel should be cut through the Loma Lake, and thence by the best route to the sea, probably utilising and improving some already existing watercourse. The different branches of the Yi River to the Grand Canal, at the points were they leave the main river, should all be supplied with regulating gates in such a manner that the amount of water passing into the Grand Canal can be under proper control. This also includes gates where the flood canal branches from the main river to the Loma Lake. By this means only the requisite amount of water will enter the Grand Canal, and in the dry season the entire discharge of the Yi River will be available, while during the rainy season all excess of water will be carried away by the flood canal.

CONTROL WORKS IN THE HUNGTZE LAKE AND THE HUAI RIVER CONSERVANCY

In the final disposition of the flood waters of the Hungtze Lake and Huai River systems certain important questions must be considered as to the absolute control of this disposition. All of these waters are drained into the Hungtze Lake, and from this basin two outlets are provided, viz:—

The Canal via Tsiang Kia-pa to the Yangtsze west of the Grand Canal.

The Canal to the east through the old bed of the Yellow River to the sea.

These two outlets will branch from the undrained portion of the Hungtze Lake, and of the two the one to the east should have the greater capacity, as during a flood it would be by far the more important.

THE YANGTSZE FLOODS

At times heavy floods occur in the Yangtsze basin and the Huai basin simultaneously, but fortunately this is not always nor even often the case. When the Yangtsze is in great flood the utility of the Tsing Kia-pa canals as flood canals would be decreased, and the greater portion of the Hungtze Lake surplus would be run off through the canal to the east.

REGULATING AND CONTROL WORKS

In years of low water in the Yangtsze and floods in the north, the amount discharged by the two canals should be so regulated that the Yangtsze canal would carry a safe maximum.

What remains of the Hungtze Lake after being drained to a certain level would serve, in an emergency, as a storage basin for the floods from the north and west, and from this basin lead the two outlet canals.

At the inlet to each of these two canals must be regulating sluices for the perfect control of the amount of water passing into each canal, and in connection with this regulating work there should be a suitable chamber lock for the passage of boats each way at all times.

ADDITIONAL EXAMINATIONS NECESSARY

The Ke River.—The Ke River should be examined from its mouth to its source west of Khaifeng-fu, its normal and flood discharges measured, and water gauges established at necessary points.

The Sha River and Other Tributaries of the Huai.—What has been said above applies to the Sha River and the tributaries of the Huai River to the west, and also to the Huai River itself to its source.

Swamp Lands.—The large area of swamp lands near the sources of the Ke and Sha Rivers should be examined with a view to drainage.

The Yellow River.—The most dangerous and menacing factor connected with any conservancy scheme for lowering the flood level and reclaiming the swamps and shallow lakes in North Anhui and North Kiangsu is the Yellow River on the north. If this river should break its dykes on the south and flow once more into the basin of the Huai, much of the problem of conservation would have to be re-solved. That such a break may occur is always a possibility which must be taken into account.

As soon as possible an accurate survey should be made of the Yellow River from the sea to the crossing of the Peking-Hankow Railway, and this survey should be continued up the river as rapidly as time and available money will permit, including the taking of levels, cross sections, gaugings, etc., with a view to the future regulation of this river.

The northern limit of the Huai basin is practically the southern dyke of the Yellow River, and this dyke should be most carefully examined for any leakage or seepage which may be taking place. If a break should occur in these dykes the most probable points would appear to be somewhere within the eighty mile section east and west of Khaifeng-fu, Honan, or more to the east where the Yellow River is now crossed by the Grand Canal, but of course a flagrant neglect of the dyke at any point might result in a break. The dykes should be watched with the greatest of care, and the men in charge should be held under the *strictest discipline.*

It is to be hoped that with this new era in China an exhaustive study of the Yellow River will be made, and means found to control it to a great extent, as there is no doubt that such controlling and training are possible.

With money, engineering skill and a strong permanent administration into which politics will not be allowed to enter, much could be done to eliminate the dangers due to the untamed condition of this river.

PERMANENT ENGINEERING DEPARTMENT

The most immediate need in the Huai River and Lakes Conservancy is a well organized Engineering Department.

The surveys already made by the Chinese survey students are of some value, but the organization has no definite head, the control is very loose and haphazard, and the men in control are totally lacking in all technical knowledge of the requirements of the problem of the methods necessary in the mere matter of surveys. Much time and money has been expended on relatively unimportant work, whilst the essential and urgent work has not been done at all. The office records of work done in the field are hopelessly in confusion. All these faults may be remedied with reorganization, method and discipline, and several well organised engineering parties should be put into the field at once.

So far the work of conservation has been considered by the Chinese merely from a provincial standpoint, and in the work done so far, Anhui and Kiangsu are intensely jealous of their own provincial rights, to the great detriment of the work. This conservancy work cannot in any way be considered provincial, if it is to be attended by any success. It is and must be of a purely national character, and carried on without the slightest regard for provincial boundaries. Topography and rainfall are the ruling elements to be considered. The administration, engineering, etc., of the conservancy must deal only with the Central Government and draw its funds from the Central Government. In the question of private lands which may be needed for the work, the Conservancy Board should have the right of "Eminent Domain," the price being settled by arbitration, or if necessary the land condemned and the price settled afterwards.

In this Report it is not necessary to go into the details of the Conservancy Organization and methods of work, but a definite well disciplined organization is needed.

WEATHER BUREAU

One of the most important departments of the Conservancy Organization, and one that should be organised and put into operation as soon as possible is a Weather Bureau, with stations established at all necessary points in the entire catchment area of the river systems under consideration.

EQUIPMENT

These stations should be supplied with the following equipment :—

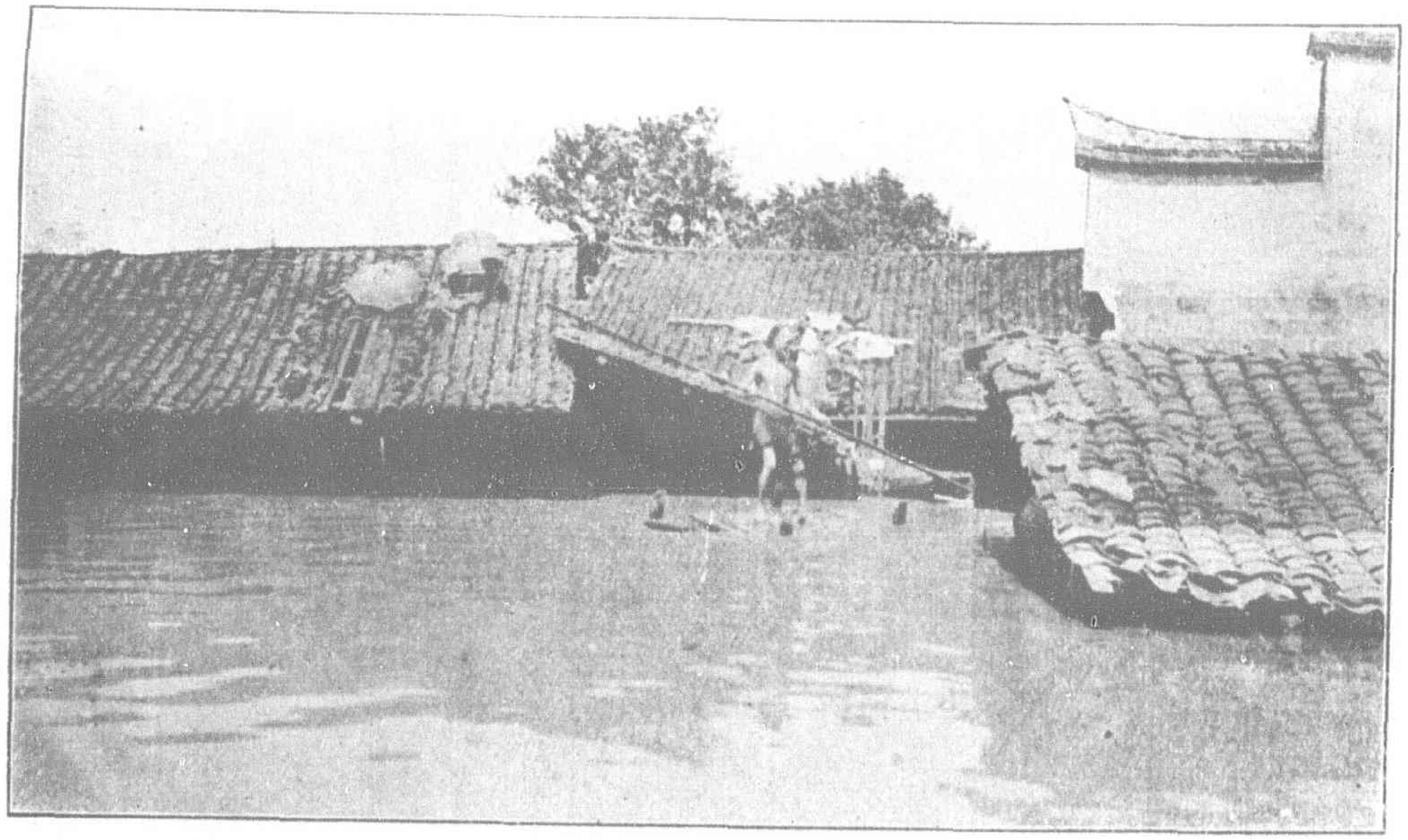
Wind Gauge, giving the direction and velocity of the wind.

Rain Gauge.—To measure the actual rainfall.

Wet and Dry Thermometers.—To give the degree of moisture.

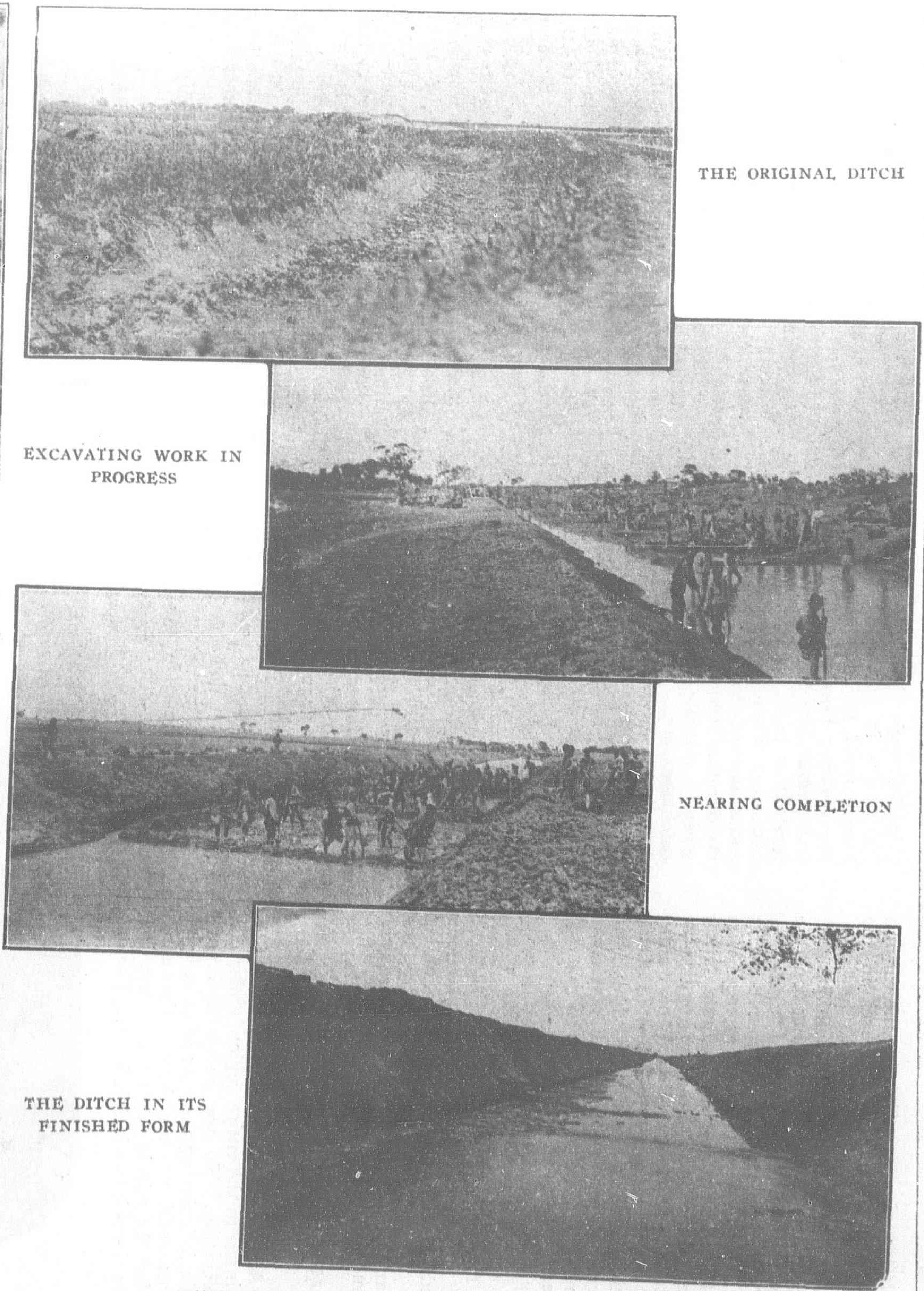
Maximum and Minimum Thermometers.—To give the temperature.

Aneroid Barometers.—To give the atmospheric pressure.



A FLOOD SCENE

A picture taken at Wuhu showing a Chinese trying to save some of his effects by putting them on the roof of his house



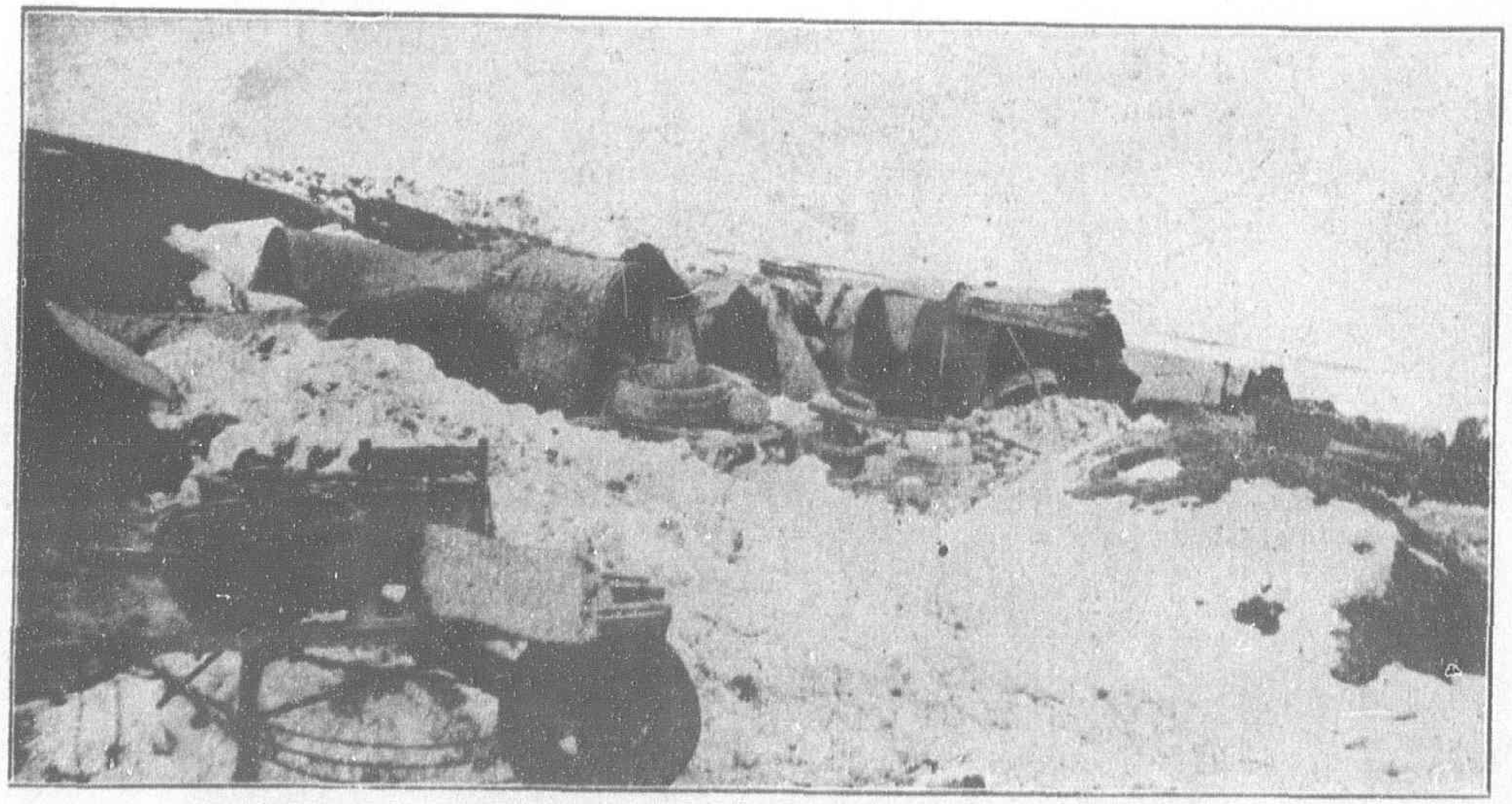
THE ORIGINAL DITCH

EXCAVATING WORK IN PROGRESS

NEARING COMPLETION

THE DITCH IN ITS FINISHED FORM

DITCH WORK DONE BY THE FAMINE RELIEF COMMITTEE



FAMINE SUFFERERS

This picture shows the conditions under which famine sufferers, whose homes had been destroyed, lived during the winter while the snow was on the ground. The past winter was a very mild one, and the snow lasted but a short time

Water Gauges.—To give the varying elevations of the water level in the rivers.

All these instruments could be self-recording or not, depending on the amount of money available.

The self-recording instruments are in in every way preferable, as they write out the record for each minute during the twenty-four hours, and require the attention of the operator only once a day to put in new charts and wind up the weights, whilst the non-recording instuments require a reading to be taken at certain fixed times, and these readings recorded.

LOCATION OF STATIONS

The weather stations should be located at points having telegraph stations, and the records should be telegraphed to the Central Office each day, and many times a day when there are great atmospheric disturbances.

NECESSITY AND ADVANTAGES OF THE WEATHER BUREAU

At present there are no records of the rainfall in the entire region under consideration. No one knows how much rain falls during the year or at any one time, and no one knows the actual effect the rain in any one area has upon the rivers into which it flows. The only thing known is that an excessive rainfall results in floods, but this is not known until the floods arrive. With the Weather Bureau stations in operation a rainfall of any importance may be foretold at least twenty-four hours in advance. When the rainfall arrives the actual amount of it can be measured and the duration recorded. With this data, given a rainfall in any part of the catchment area, say the mountains of Honan, not only will the actual amount of water which has fallen be known, but also the effect of this rainfall upon the streams and rivers through which it flows away will be known hours and days before the arrival of the water, depending upon the distance from the actual rain centre. For instance, heavy rains occur in the mountains of Honan. The duration and number of inches are wired to the Central Station. From there advice is at once telegraphed to the towns, cities or control works affected, that at such an hour the river will begin to rise, and will probably reach such-and-such a maximum elevation. Thus there is ample time to take all necessary precautions, and with the regulating works handle the floods with a minimum of damage. By means of the daily Weather Reports the farming and boating people can arrange their affairs with much more certainty and profit.

When the Conservation and Regulating Works are completed, this service will be absolutely necessary in order that the full value of the work done may be realised. Advance knowledge will be available of the coming of floods, the amount of water to be taken care of, the channels through which it will come, and the moment at which it will arrive.

This Weather Service should be extended to the Yangtsze Valley and also to the Yellow River basin, and the more rapidly this is done the sooner will exact data be available for the regulation of these rivers. This Bureau should be worked in connection with the Weather Bureau of the Siccawei Observatory, Shanghai.

ESTIMATED COST OF WORKS

The estimated cost of the work outlined in this report will be about 35,000,000 Mexican Dollars, and the time necessary for its completion—provided no delays are occasioned by lack of money at the time when it is needed—will be from six to seven years.

As to the results which will be obtained after the completion of the work, they will be: the doing away of all but abnormal floods over an area of some 17,000 square miles, the draining of this whole area and the lowering of the flood level to such an extent that in all but abnormal years two crops will be

A GROUP OF REFUGEES PASSING THROUGH HWAIANFU, IN N. KIANGSU

All of the family possessions, excepting perhaps an acre or two of land, are on their backs or on the wheelbarrow possible each year, where, under present conditions, two crops in five years is the rule.

In addition to this improvement in land which is now supposed to be under cultivation, there will also be reclaimed some 6,000,000 Chinese *mou* of land which is now absolutely valueless, being covered with shallow lakes or swamps.

There will also be a saving of the cost of the annual famine relief, which for many years has been poured by millions and millions of dollars into this section of China.

The moral results will be the elimination of the suffering, starvation and degeneration of several millions of people, who now are fast becoming beggars and robbers; the turning into producers of these millions who now are not only non-producers, but are becoming a menace to the country and cause of unrest and lawlessness.

In view of these obtainable results, the expenditure of this vast sum of money for the conservancy of this region is not only justifiable from a financial point of view, but is a moral necessity for the good name of China.

STRAITS SETTLEMENTS HARBOUR WORKS

At a recent meeting of the Straits Settlements Legislative Council His Excellency Sir Arthur Young, the Governor, referred to the harbour works of the colony, in the following terms:

The net revenue of the Tanjong Paga Dock Board for the half-year ending December 31, 1911, was $909,416 and that for the half-year ending June 30, 1912, $904,264 or in the aggregate for the period under review $1,813,680, showing an increase of $383,194 over that for the year ending June 30, 1911.

The number of vessels using the wharves during the year ending 30 June, 1912, was 2,634 with a net registered tonnage of 5,156,066 tons as compared with 2,404 vessels of a tonnage of 4,698,160 for the previous year ending June 30, 1911.

The quantity of coal and cargo handled in the corresponding periods above named was 2,467,785 tons and 2,333,832 tons, respectively, showing an increase of 133,953 tons for the current year.

The above figures may, I suggest, be considered satisfactory, especially having regard to the inevitable dislocation of facilities on the premises and curtailment of accommodation at the wharves during the works of reconstruction and extension now in progress at Tanjong Pagar.

The construction, departmentally, of a further section of the West Wharf, referred to in my address of last year, would appear to have fully justified its execution and has provided some considerable measure of relief to the congestion engendered by the suspension of the works by Messrs. John Aird & Co., in the early part of last year.

I informed you last year that the differences between this firm and the Board formed the subject of proceedings in the Courts in England. The proceedings still continue but the case is expected to come on for hearing during the present month.

With regard to the progress of the Lagoon Dock and Main Wharf Reconstruction Works at Tanjong Pagar, it is satisfactory to be able to state that in the hands of Messrs. Topham, Jones and Railton, who took over their completion, under contract, on July 18, 1911, the works have been vigorously prosecuted and show marked evidence of their occupation.

The value of work executed by Messrs. Topham, Jones and Railton as certified for payment under the Supplemental Contract up to June 30, 1912, is £138,400 and the average number of men employed on the works is two thousand.

The construction of the New Graving Dock at Kepple Harbour has progressed most satisfactorily and is now rapidly approaching completion. The construction work of the Dock itself is finished and the entrance walls and dredged approaches, together with the general formation of the quays, etc., are being pushed on vigorously by the Contractors, Messrs. Topham, Jones and Railton, while the Caissons, Pumping Machinery, Cranes, and general equipment of the Dock are all well in hand.

The total value of the work executed up to June 30, 1912, on the Graving Dock Contract is £296,600 and the average number of men employed is between eight and nine hundred.

SINGAPORE HARBOUR WORKS

Good process has been made during the past year with the works to be carried out under the Supplemental Contract dated August, 1911, for the completion of the Harbour Scheme.

HAICHOW CITY

A street in the centre of Haichow city, the proposed new port

The two portions of the Telok Ayer Quay Wall have been completed to a total length of 4,140 ft., and the returns forming the ends of the two piers pounding the tidal basin are almost complete. The sinking of cylinders for the two piers and the preparation of ferro-concrete superstructure of the same are well forward.

The reclamation of the site surrounding the tidal basin has continued satisfactorily, the material for the purpose having been derived from Mount Palmer since the completion of the excavation of the Government property at Mount Wallich,

Good progress has been made with the Mole, a total of 291,000 tons of granite having been deposited during the period under review.

The number of men employed is at present about 2,050 of whom 100 are Europeans and the total sum paid to the Contractors for work done during the past twelve months was £246,500.

GOVERNMENT WHARVES, PENANG

The net revenue from the Government Wharves, Penang, for the year ending June 30, 1912, is $92,382 as compared with that of the previous year to June 30, 1911, $97,754.

The tonnage handled in Coal and Cargo for these periods is, respectively, 615,686 tons and 501,032 tons.

NEW COMPANIES

Manila Motofoto Company.—The Motofoto Company incorporated with a capital of P.8,000 has been organized and application for registration filed with the Bureau of Archives. This company proposes undertaking general photographic work, moving picture films, operate theaters, movies, etc., in the islands. The incorporators are: Frank H. Goulette, E. A. Cuddy, O. S. Cole, E. I. Standish, Frederick Hollins, W. K. Bachelder and E. I. Young. E. I. Young, has been nominated treasurer and a large portion of the stock is subscribed.

San Miguel Brewery. — Seven million pesos is the amount for which the new Roxas-San Miguel brewing company is capitalized, and the application for the issue of papers of incorporation will be made as soon as certain minor details have been attended to. The new company is an accomplished fact, however, save for the formal matter of the application for papers, and already P.6,500,000 of the total capital has been subscribed and fully paid up.

The company takes over the business of the San Miguel brewery, and the incorporators of the new enterprise are Antonio R. Roxas, Enrique P. Brias, Enrique Zobel, Ramon J. Fernandez, Francisco Ortigas, Jose M. Tuason, and Antonio Brias.

All but half a million pesos worth of the capital is already subscribed, but that balance will be offered to the public in 5,000 shares of P.100 each.

Manila Brewing and Malting Co.—Incorporation papers of the Manila Brewing and Malting Company were to be filed on Oct. 1, Work is to be started on the buildings by the first of the year.

Stockholders have already subscribed P.80,000 of the P.250,000 worth of stock to be issued. Max Druseidt, one of the heavy stockholders, subscribed P.48,000, and will be president and treasurer. Harry L. Kreidt, manager of the printing and engraving department of E. C. McCullough Company is to be secretary and general manager and a brewmaster is to be imported from Germany.

All machinery is to be secured in the United States and the most modern equipment is to be imported. Plans are now being drawn and there is every reason to believe that work will be started by January 1.

There are 10,000 shares at P.10 a share and stock is to be issued as soon as the concern begins to brew.

THE FAR EASTERN REVIEW

COMMERCE :-: ENGINEERING :-: FINANCE

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FAMINE PREVENTION IN CHINA

In this issue we are able to publish the exhaustive report prepared by Mr. Charles Davis Jameson, Mem.-Am. Soc.C.E., on "River, Lake, and Land Conservancy in Portions of the Provinces of Anhui and Kiangsu, north of the Yangtsze River." Mr. Jameson was despatched to China by the American Red Cross Society to accomplish this work, the object being to present to China a practical scheme whereby something tangible might be effected to prevent the continual recurrence of famine and the contingent periodical toll of human life and human degradation, as well as to render immune from ordinary floods huge tracts of cultivable land which have been converted by natural deficiencies and culpable human negligence into unproductive wastes. Mr. Jameson has done his work well. Perusal of his informative findings will repay all who take an intelligent interest in the up-building of China, and all who have in the past so generously contributed towards the relief of the millions of sufferers upon whose behalf appeals are constantly being made to the world.

Mr. Jameson commenced his investigations on April 18, 1911, and concluded them on June 14, 1912, during which time he travelled some 20,406 li, or roughly, 6,802 miles. He brought to bear upon his work not only an intimate knowledge of China, but also previous experience in the problems of his profession peculiar to the task in front of him, and the result has been the preparation of the only practical programme of conservancy work yet presented in China for famine prevention. The Chinese people and the Chinese Government have for so long been beholden to foreign charity for aid to save their suffering fellow nationals that it is now distinctly incumbent upon them promptly to take advantage of Mr. Jameson's efforts and concrete suggestions if they wish to escape a charge of callous indifference to the trials of the unfortunate inhabitants of the famine areas or a woeful disregard of national duties. China cannot decently depend much longer upon foreign initiative in famine relief and prevention, and if there is pride in this new Republic surely it can be mustered to spur the provinces on to a common effort to make the reclamation of Anhui and Kiangsu a national enterprise!

The Central China Famine Relief Committee, in the report of their work just issued, make a strong appeal to this end, and draw special attention to the fact that, although many lives were saved, and much useful work was done, they considered the present methods of famine relief utterly inadequate. They appeal to the Republican Government and the people of China generally to realise that another famine is almost certain to occur in the near future, unless immediate steps are taken to begin river conservancy works. By this alone can famines be averted, and by this alone can the economic, intellectual, and moral condition of probably not less than five million people be salved and safeguarded. While recognising that the Central Government finds itself in urgent need of money for many different purposes the Committee nevertheless feel that from the earliest loans that may be made a sufficient sum shou'd be set aside for the beginning of conservancy work. This is an appeal which should be earnestly listened to by the Government as a duty to the people and the country, and steps should be taken immediately to have an intelligent practical interpretation made of Mr. Jameson's suggestions.

The cost of a thorough scheme of conservancy would be enormous. Mr. Jameson estimates an expenditure of thirty-five millions ($35,000,000) Mexican dollars, and some six or seven years of time to carry out his proposal. But the results will justify that expenditure. He foresees the prevention of damage by all but abnormal floods over an area of some 17,000 square miles, and the amelioration of conditions to such an extent that two crops will be possible each year, where, under present conditions, two crops in five years is the rule. There will be reclamations of some six millions Chinese mow of land now valueless; the obviation of a flow of millions upon millions of dollars into the affected territory in the shape of famine relief from foreign sources; the elimination of the sufferings, starvation, and degeneration of millions of people, fast becoming beggars and robbers, and their conversion into producers and useful citizens.

China now has before her the report of Mr. Jameson, and the report of the Central China Famine Relief Committee. Are there not some Chinese patriots who have the courage and the influence to arise before the seats of the mighty and compel serious consideration of the suggestions contained in these reports with the object of once and for all removing the disgrace that besmirches the escutcheon of the nation?

MONEY IN CHINA

To the average layman words and phrases such as "Bi-metallism" and "The Currency Problem" when seen at the top of a column, act as an irresistible inducement to "skip." The intricacies of the subject are certainly awe inspiring, and, for the greater part, writers on these subjects utilize such highly technical phraseology that the reader who ventures upon the search for financial light, retires with his brain reeling and a more settled ignorance of the subject than before. It is therefore with real pleasure that we publish in this number a precis of the lucid and illuminating contribution to the study of the currency problem in China prepared by Dr. Vissering, who combines the most profound expert knowledge with a tender regard for the non-technical reader. The average layman, we confidently assert, will gain more real knowledge of currency matters in general, and of China's money problems in particular, from the perusal of this precis than could be obtained from any other exposition of the questions involved that has recently seen the light.

It is not our purpose to traverse the ground covered by Dr. Vissering at this juncture. Our immediate object is to direct the attention of non-technical readers to the fact that Dr. Vissering's report is expressed so clearly that the assimilation of the really valuable information incorporated is a pleasure instead of a task.

China, unfortunately for herself, does not make the best use of the work of the experts she pays to advise her. The practice has been adopted of paying advisers handsomely and keeping their reports as pleasant records of their activity, too precious to be removed from departmental pigeonholes. Even now, when a new spirit is supposed to be inspiring China, we find her proposing to take steps likely to defeat the objects sought to be attained by Dr. Vissering. The following telegram, dated Peking, November 11, shows that the Government is unwisely attempting to take short cuts, when, as Dr. Vissering proves conclusively, short cuts would almost certainly lead to disaster:—

> "The Cabinet held a special meeting on the 10th inst., at which it was decided (1) that a special treaty be entered into with the Mexican Government to limit the importation of Mexican dollars, (2) further manufacturing of copper coins should be prohibited throughout the country and (3) the paper notes issued by the former military authorities should be withdrawn and only the Government will have the power to issue notes thereafter. The various foreign banks will be requested to withdraw the banknotes issued by them to a certain extent, as the bank authorities consider convenient."

A much wiser step has been taken in calling upon the provincial authorities for full reports in regard to the coins and tokens in circulation, and for information relative to banknotes. The information sought will be invaluable when currency reform is seriously entered upon. The questions asked, according to the *Peking Daily News*, are as follow:—

1.—What are the kinds of dollars that are in current use in your locality?

2.—The dollars of which provinces are accepted most readily on the market?

3.—Are the dollars of other provinces subject to discount on the market? If, so, how much upon each dollar?

4.—What is the weight of the dollar coined in your province? Its percentage of silver, of lead or copper?

5.—Since the establishment of the Central Mint in Tientsin, how many copper cents has your province coined? How is their circulation on the market?

6.—What is the exchange value of the copper cents for the silver dollar in your locality?

7.—Is there any discount on the copper cent in the market?

8.—Are the small silver pieces readily accepted on the market? What are their relative values?

9.—What are the kinds of the bank notes used in your locality? Which are the most popular? What are their face values?

10.—What is the amount of the bank notes that have been issued thus far? Are there reserves in the banks for the issue of these bank notes? If so, how much?

11.—Are the bank notes readily accepted on the market? Are they driving the silver and copper out of the market?

12.—Besides the bank notes, are there other kinds of notes, such as cheques and promissory notes, used on the market? If so, what are their systems of management?

Dr. SUN YAT SEN'S RAILWAY SCHEME

Fourteen years ago when spheres of influence were accepted as the expression of foreign policy towards China, and the world freely discussed the partition of the Empire amongst European Powers, and at a time when the mailed fist was banged on the table at Peking to secure leases, concessions, and loans, a railway scheme for the country was evolved. The needs of China were not consulted except inasmuch as the country would benefit by the construction of any line between two cities. All Powers laid down certain projects within the confines of their respective spheres of influence, having for their main objective the development and aggrandizement of the leased or ceded ports on the coast of China, or the enrichment of special foreign interests. And the lines then projected still stand as the only scheme for the construction of railways to develop the country. Foreign maps of the country published ten and twelve years ago, strikingly illustrate the set foreign policies behind most of the schemes.

It is interesting to know that twelve years ago, when foreign railway projectors had linked up the principal centers of China, with lines serving particular political ends, there was one man in China devoting his time to dreams of a purely national system which would counteract the other schemes and serve to advance the special interests of China. This Chinese patriot had other visions; he saw in his dreams the overthrow of the dreaded and tyrannical Manchu dynasty, and the creation, in the ruins of the oldest empire in the world, of a new Republic. Surely he was a visionary, a dreamer of dreams, and one to be shunned by practical men! But the dreamer walked in his sleep. He kept moving onwards. His path led him around the world, where he told his fellow countrymen of his visions. The Manchu Government laid a price upon his head, and emissaries were despatched to follow and awaken the sleep walker, or lead him to an eternal slumber. He passed his years in exile, and labored to make his dreams come true. A year ago the miracle of miracles occurred, and the hoary old Empire tottered to its fall, before the wave of republicanism which swept over the land. The dreamer awoke to find himself famous—the chosen President of this great Republic. Rather a practical ending to such an impossible and impracticable vision! The world has need of dreamers like Dr. Sun Yat Sen. And yet, despite the great object lesson of this crusade and its grand culmination, there are those who still refuse to recognize in Dr. Sun's schemes anything else but visions.

When on the realization of his dreams to secure peace for his country, the patriot stepped aside, and unselfishly gave way to Yuan Shih Kai, the practical world again jeered and refused to understand an action too lofty for selfish and mercenary minds to grasp. It is also interesting to know that as soon as the dreamer awoke to find his one great vision realized, he slid back again into the land of nod, and his mind centered on the old wall map on which he had, ten years before, traced out a system of railways for his country. Knowing that the consolidation of China, the development of her industries, the growth of her agriculture, the exploitation of her mineral wealth and her political future, could only be secured by the civilizing factor of a great network of railways, the dreamer again started to walk and travel throughout the land to educate the people to his view point.

He knew that foreign Powers and syndicates had cast covetous eyes on certain sections of his mother land, and that their policy towards his country found expression in their railway projects. He knew also that there were many treaties, conventions, understandings, protocols, leases, concessions, loan agreements, and other documents, some secret, some public, that had been drawn up and signed in the past restricting his country in the free development of its resources and construction of railways. He knew that certain nations had arrogated to themselves, by Right of Might, certain powers which infringed the sovereign rights of China, and prohibited the free construction of certain railways without their consent. He knew that many financial, and engineering problems and obstacles had to be solved and overcome, before his dream would come true. He also realized that the provincial rights had to be given careful and equitable consideration, and that the relation of the provinces to the Central Government must be clearly defined before a national system of railways could hope for success.

He knew that railway control was one of the most vital questions of Chinese domestic politics and that several Presidents of previous Railway Boards under the old regime had resigned rather than face the temper of the people. He knew that to the outside world, the question of provincial railway rights was the one which had been employed to arouse certain sections of the country against the greed of the Manchu authorities. He knew all this, but he also knew what the outside world did not know or understand: that all this hostility of the provinces against the interference of Peking in the control of railways was only one of the many outward manifestations of the revolutionary movement that he himself was responsible for. And he felt that now the Republic was established, this phase of the situation, so troublesome and dangerous to the Manchus, would disappear in time, before a campaign of education. In fact, Dr. Sun Yat Sen was fully cognizant of all the political and other obstacles in the path of railway construction, yet firm in his conviction that communications were the key to the future position of his country, he set to work to devise a preliminary scheme which would serve to arouse enthusiasm throughout the country, and provoke a healthy discussion of the whole subject. Had Dr. Sun been actuated by a desire to secure personal honour or temporary profit, he would have confined himself to projecting some little five hundred mile line, threading its way carefully through districts or between cities not covered by existing agreements. And the little circle of foreigners at Peking, would have clapped their hands with delight and applauded such an exhibition of statesmanship and practical politics.

But the dreamer dreamed, and he saw in his prophetic mind, the vast surface of his country, gridironed by railroads, with all the leading cities connected together, and the whole forming a system, such as those of which America or European countries could boast. The petty squabbles of foreign syndicates over rights to construct this or that section, or the claims of others to concessions forced from the country when the rulers were ignorant of their commercial or political value, did not enter the mind of Dr. Sun when he drew the lines of his system on his map. What are the rights of a few foreign syndicates as compared with the welfare of a great nation? All the rights already ceded away do not embrace more than 1,000 miles, and what are 1,000 miles of railways in a country so vast as China? And Dr. Sun while he recognized existing rights, limited to certain small sections of lines, embraced them all in one big scheme. He saw in his mind's eye that some day in the future, the country could easily find room for 60,000 miles of railways, so he drew them all in his map. And he tucked the map under his arm and carried it to Peking, and there in the presence of the President and his Cabinet, the Ex-President laid before them his ideas of what a railway system for China really ought to be. To those of the old regime, whose horizon had been limited to the construction of this or that line for the sake of the official profits connected with the enterprise, such a comprehensive scheme was naturally too big for them to grasp. But President Yuan gave way before the earnest arguments of the Ex-President and then and there gave his assent to the scheme, and issued a Mandate empowering Dr. Sun Yat Sen to enter into negotiations for the financing and construction of the lines. In many speeches at Peking and elsewhere Dr. Sun emphasized the necessity of an adequate system of railways, and to arouse the interest and enthusiasm of his audience, dwelt on the great extent of mileage needed to develop the country. He accomplished his object. He left Peking for the South, to take up his great work.

With a thorough understanding and mutual confidence between the President and Ex-President, the political peace of the republic is assured. Had Dr. Sun Yat Sen held out firmly at Nanking he might now be the President, but he willingly sacrificed his personal ambitions for what he considered the best interests of his country, and to hasten the return of peace. President Yuan can only have one feeling for Ex-President Sun, and every instinct of honor must bind him with the closest ties of friendship for the man who made possible his ascension to his present high position. And despite the many rumors finding credence in Shanghai and elsewhere, it may be affirmed that the most cordial and friendly relations exist between the two leaders of the nation. If President Yuan is strong in the North, Dr. Sun Yat Sen still controls the South, and practical politics, apart from friendly motives, must influence the President in retaining the support of Dr. Sun, and practical politics in addition to strong ties of friendship will guide the President in his future attitude towards the man to whom he has entrusted the construction of railways. It has been urged in some quarters that President Yuan and his adherents in Peking, animated by petty and unworthy political motives, only sanctioned Dr. Sun's plans in the hope that by so doing, he would hasten his political downfall, and by a premature exposition of his schemes the people of the country would turn against him. It has also been urged that the sum appropriated to defray the expenses of Dr. Sun's railway office, was only the price to purchase his political support in the future, and that the Peking authorities did not intend that Dr. Sun should ever seriously undertake negotiations for the financing or construction of railways. In other words, that the Peking authorities did not take Dr. Sun's appointment seriously and that as soon as he attempted to put his ideas in operation, obstacles would be placed in his way to frustrate their practical application.

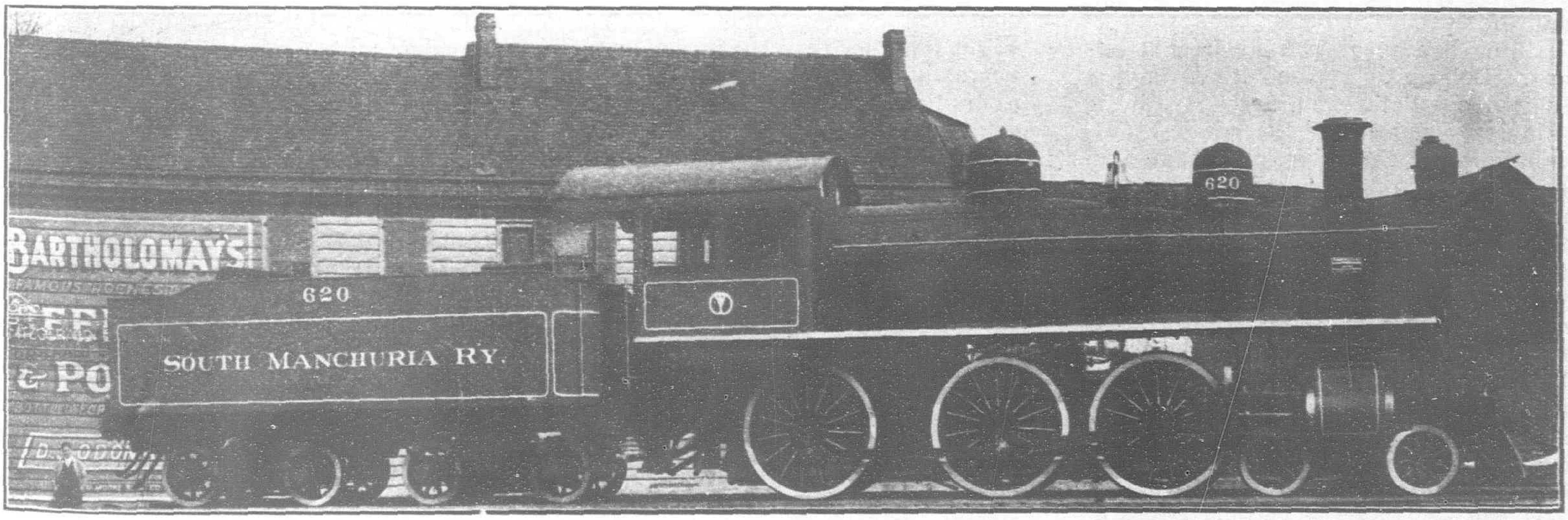
It is obvious that such stories can have little foundation, for reasons already stated, for President Yuan would not deliberately wound the feelings of Dr. Sun, or forfeit the support of the South, by any international slight to its acknowledged leader.

There may be many of the old regime, some of whom are still in power, who look backward to the old order of things and resent the President's appointment of Dr. Sun Yat Sen to a position superior to that of the Minister of Railways, in regard to the construction of new lines. In fact considerable criticism has already been aroused, some characterizing the appointment as superfluous, and conflicting with the duties of the Ministry. There are, however, good precedents for the creation of a special Commission to study national railway conditions and necessities; devise a general scheme; originate a railway policy and enter into necessary financial arrangements to make it a success. The powers of such a Commission, or independent national railway organization, need not conflict with the control over existing lines. The Ministry of Communications may still exercise full authority over all lines in operation; those under construction and those already provided for. Other countries have found it profitable to entrust the work of projecting new lines to a special permanent commission working independently of, but in harmony with, the Central Railway Board. In any country operating a national system of railways, where the supreme control is affected by politics, and where the responsible authority holds his position by virtue of political influence, the existence of a permanent Central Railway Commission insures the constant evolution of a national railway policy, unaffected by the changes in the Central Board. It has already been pointed out that China has no definite national railway scheme for the development of her territory, apart from the many semi-political lines and extensions advanced by foreign Powers for the furtherance of their own interests. And during the last fourteen years, and especially in the last four years, there has been such a procession of Presidents or Ministers, in temporary control of the Railway Board, that it has been impossible for any one of them to concentrate his thoughts or time upon any general scheme for the welfare of the nation. Under the old regime, the Presidents of the Railway Boards were fully occupied in dealing with the schemes advanced by foreign interests. Conditions have changed. No longer can China wait upon the whims of any high official temporarily filling the post of Railway Minister. Ministers come and Ministers go, and each one has his own ideas of railway construction. In the one year since the establishment of the Republic, three excellent officials have presided over the Ministry of

Communications. Although it is to be hoped that the present incumbent may retain the portfolio for a few years, there is already talk of shifting him to another Cabinet position, and appointing a new man to fill the vacancy. While such conditions exist at Peking, the best interests of the country demand the existence of a purely non-political permanent Central Railway organization, that will draw up a national scheme, originate a policy, and devise a way to finance it along the most equitable and just lines for the nation and the investor. With such a Board exercising its functions safe from political attacks, the Ministry of Communications may remain in the arena of practical politics, and its head may be shifted at the will of the President, without in the least retarding the all important work of developing the country.

So, aside from the strongest ties of gratitude and friendship, and the promptings of practical politics, President Yuan must be influenced by the pressing economic demands of the country, to stand by and support Ex-President Sun in making his work a success. Dr. Sun's plans may appear to some in Peking, as mere dreams, and they may attach little importance to his scheme, but they will have to admit that Dr. Sun is a very wide awake dreamer, and has a habit of doing things while others talk about them. Dr. Sun has taken on his shoulders the most important task of the Government. Nearly all of China's foreign troubles are bound up in railway concessions, and her greatest domestic political differences have arisen from the same cause. How many men under the old regime shirked the responsibility of their position, rather than face the determined attitude of the provinces on the railway question? And yet, with a full knowledge of the gravity of the situation, with powerful foreign and domestic influences to contend against, Dr. Sun Yat Sen accepts a duty and enters into a work, in which no other single official in China could hope to succeed. The Ex-President is the only man in China, apart from President Yuan, who commands sufficient influence at home and abroad to insure the sympathy of his fellow countrymen and the respect of foreign financiers. He has willingly sacrificed his personal ambitions, retired from active politics, leaving the field clear for President Yuan, and taken on his shoulders the one great task which others have evaded. There are those who profess to believe that Dr. Sun Yat Sen having received the sum of Tls. 30,000 per month from the President, to defray the expenses of his Central Railway Office, will be prepared to accept this sum as a personal pension. Let us see how far his actions justify this unworthy belief. Dr. Sun, since his appointment to organize a Central National Railway Company, has accepted the task in the same spirit as he did the work of organizing a revolution. He travelled through the northern provinces, and at every stopping place preached the gospel of the iron rail and its advantages to enthusiastic audiences. He wended his way up the Yangtsze, and again in three provinces he expounded to the people his ideas. His personality and directness of speech won sympathetic adherents at each place, and where a year ago the provincial gentry were hidebound in their opposition to the Central Government, and the introduction of foreign capital, they are now clamoring for foreign financial help. If the Ex-President did nothing more than travel around the provinces educating the people to the necessity of foreign capital for the construction of their railways, he will have fully earned the Tls. 30,000 per month appropriated, by the Government. But does Dr. Sun accept that sum as a personal income? We are able to say that he does not, and that it is merely advanced to him by the Government as a loan—eventually to be repaid. That is the understanding between Dr. Sun and the Government. Only a man of Dr. Sun's stamp and standing could expound such a delicate and vital issue before an audience of his own countrymen, with hope of respectful attention. Dr. Sun, after preparing the way and interesting the people, settled down to equally real work. He surrounded himself with a competent staff, and opened offices in Shanghai. Everything has been conducted as economically as possible, consistent with the importance of the work. Dr. Sun himself has only accepted a modest salary from the Government appropriation for the maintenance of the office. His staff have entered into their duties with a full realization of the hard and arduous work ahead, content with the hope that they may be instrumental in bringing about some solution of the weighty problems confronting the country.

There are many important matters to be settled before Dr. Sun can take the public into his confidence concerning his plans, and invite the co-operation of foreign capitalists. There are so many divergent interests to be considered and so many difficulties surrounding the construction of certain railways in China, that the most careful preliminary studies must be made to avoid the possibility of defeat. Dr. Sun's success will hinge largely on the outcome of the first proposition. If the terms of the first agreement are equitable and just to China, and free from any taint or suspicion of graft or corruption, such as have characterized other similar deals in the past, his success is assured. And those who know Dr. Sun Yat Sen as he really is feel confident that, with frank and unreserved assistance from the quarters from which he has every right to expect support, he will succeed in transforming what the unthinking term a "dream" into a tangible reality that will work for the enduring weal of the people of China.



TEN-WHEEL PASSENGER LOCOMOTIVE

Built for the South Manchuria Railway by the American Locomotive Company. Several locomotives of the same type were delivered in 1907, the results in the operation of which were so satisfactory that six duplicate engines were ordered from the builders last fall, and delivered during the month of July, this year.

CURRENCY REFORM IN CHINA

DR. G. VISSERING'S REMARKABLE AND VALUABLE REPORT

With characteristic modesty Dr. G. Vissering, President of the Java Bank, and Monetary Adviser to the Chinese Government in 1911, describes his valuable treatise "On Chinese Currency" as "preliminary remarks about the monetary reform in China." This work has been issued for private circulation only; a restriction that we hope will be removed as the report embodies the results of careful and exhaustive investigations, presented in a lucid and illuminating manner by a writer who shows in every sentence that his high reputation as a financial expert is thoroughly deserved. In a short dedication Dr. Vissering recalls the interesting fact that his elder brother, Dr. W. Vissering, published in 1877 an essay with the title "On Chinese Currency," which was an account of the ancient currency in China. Looking upon his own labours as, to a certain degree, a continuation of the work of his brother, he has given the present volume the same title.

So comprehensive is the manner in which Dr. Vissering has treated his subject that it is extremely difficult to compress even the main features of his report within the space limitations of this article. However, the following is an extremely inadequate *precis* of his exhaustive treatise. In his introduction he gives the key-note to the following pages, *i.e.*, that in the immediate future it is likely that the monetary reform needed by China will not produce the best currency system that could be invented. It would probably be best to begin with such modifications of the currency as would offer for the time being the best chances of success, and the best security for the Government and for general business.

China has never had any real standard. Dollars of various kinds have a limited circulation, but sycee is still the principal medium of exchange. Calculations are, however, complicated in practice by the employment of a fictitous unit, the tael, of which there are more than a hundred different kinds in the country. The only real currency in the whole of China is copper. The differences in value of these copper coins renders the small dealings of the population appallingly uncertain. Any reform scheme would have to take into account the foreign dollars now in circulation which would not be accepted in the country of origin, such as the Mexican dollars—the various kinds of Chinese dollars and the sycee of different fineness. All these kinds of money should be regarded simply as bullion which could be used for the new silver coins to be issued. It would be necessary to establish a new unit and by law to fix the conversion value of the different taels expressed in proportion to this new unit. Account would also have to be taken of the immense circulation of copper coins and the wide spread employment of bank notes and other similar kinds of fiduciary money.

THE GOLD EXCHANGE STANDARD

The gold standard is inapplicable to China at the present moment because a gold coin will be far too big a unit for ordinary transactions in the interior. The Gold Exchange Standard has the advantage of ensuring stability of prices and of international exchanges in nearly the same degree as a gold standard, provided steps be taken to guarantee the nominal value of token coins and to maintain the parity of foreign exchanges. The Gold Exchange Standard consists of a circulation, within a country of silver token currency, government currency paper or bank notes, viz., such means of payment as have not in themselves a sufficient intrinsic, or no value at all, and which are being maintained at a parity with gold, not by an extensive circulation of gold coins nor by a large stock of gold *within* the country, but by an explicit gold reserve *abroad*. This system is employed by Netherlands, India, the Straits Settlements, the Philippines, Argentina, Siam, Japan and to a certain extent by Russia.

The great difficulty would be in the circulation of token money in silver and copper. The intrinsic value of this token money must necessarily be considerably lower than the nominal value in view of the fluctuations in prices of silver and copper, as, if during a rise in prices the market value of the metal contained in these coins was to become slightly higher than the face value, they would at once be melted down and sold as bullion. It will therefore be an absolute necessity to establish a rather broad margin between the real and the nominal value of such token coins, which margin, however, will of course mean a large profit on counterfeiting, even if the counterfeiters should use the same full weight of fine metal as is contained in the legal money. Of course this counterfeiting must be prevented with all the energy which the government has at its command, and heavy punishments should be inflicted on the forgers, as they are a great danger to the credit of the state and would cause widespread disturbance of economical conditions.

It follows that a token money can only be issued by a government which is powerful enough to prevent a serious degree of counterfeiting even in the interior parts of the country and at the same time to defend all its frontiers against imports of counterfeit money from abroad. If the government were to fail in either of these respects the introduction of a gold standard or of a gold exchange standard would be an absolute failure and would entail the most disastrous consequences.

In many parts of China the standard of life is so low that even silver is too valuable to be used for any but the largest transactions, and copper is found more convenient. Barter is still carried on in many localities. One of the principal difficulties is to find a monetary system that will be acceptable throughout the immense area of China. A gold standard or any system approaching it might therefore easily be found to suit certain regions, while people in other districts would temporarily be better off, if they were allowed to keep a silver standard, or even a copper circulation, as long as this could be made to rest upon sound foundations. As long as these differences remain so pronounced, the carrying out of one single standard for the whole country at once would therefore, no doubt, cause many troubles in those parts which are not yet fit for such a system, and it is to be feared that a failure of the system, at least in some parts, would be an inevitable consequence and would entail disturbances of various kinds.

Many of the difficulties could be avoided by starting on a real silver basis, but there would then be the disadvantages attaching to the absence of a standard of value of sufficient fixity, as at present. Considering all these facts it is very questionable, not only if it is advisable, but even if it is possible to introduce at once one single system for the whole of such a country as China. European countries and the United States of America have taken time to complete their evolution and things had ample opportunity for setting. Would it thus not be a mistake to expect that China, which extends over an area many times larger than that of European countries and even that of the United States, could assimilate herself as a whole to these new conditions in a period of only a few years.

It is suggested that from the present standpoint of financial science the best monetary system for China in the first twenty or thirty years will be the gold exchange system. If carried out in a skilful manner it will procure stability of the money in circulation, and thereby insure stability of title in the interior of the country as well as in the financial relations with foreign countries; at the same time it will supply an adequate circulation of small silver, nickel and copper coins, which will always continue to be wanted especially by an Asiatic country with a large population of rather small means. Consequently the opinion is held that the ultimate object which a present monetary reform ought to have in view is a gold exchange system for the whole of China with a circulation of token coins of silver, nickel and copper. This choice will not exclude the possibility of adopting in later years a real gold standard, if this should prove in the long run to be desirable. It will be absolutely necessary to guarantee the nominal value of these token coins by the institution of a gold reserve fund. Whether this be held in the country itself in the shape of a stock of gold or whether it be held abroad to ensure the payment of gold drafts, it is evident that satisfactory measures should be taken to protect this gold reserve from being exhausted to such an extent that the exchangeability of token coins would be in danger.

The existing silver and copper coins could be left in circulation as long as they were of any real use to the community, and new silver coins of the same size could be minted as absolutely necessary, whilst combining as far as possible right from the beginning, this silver circulation with the principles and advantages of a gold exchange standard system. A connection but *not* a fixed relation would be maintained between silver currency and gold currency; no bi-metallic system with a fixed relation between the values of two freely circulating metals, both acting as standards, should be aimed at. Bi-metallism in the old scientific sense is out of the question for China. But, with this reservation, it would be advisable during the introductory period to have two standards together: a gold exchange standard as far as possible, and also at the same time a silver standard. This is what was done in Netherlands India after the official adoption of the gold exchange standard in 1877, by legally introducing the ten guilder piece of the Netherlands as a gold standard coin, and by fixing the silver and copper coin then already in circulation as token coins in a fixed relation to the gold standard coin. These remained in circulation in certain localities and were accepted by the population at their weight of real silver. Private bank notes based on silver were also allowed unrestricted circulation for a considerable time. Simultaneously the Government maintained in circulation its own official currency, the silver and copper token coins, and eventually the gold standard coin; moreover the bank notes of the central bank of issue, the Java Bank, which are issued in guilders, were also in circulation.

The Government fixed and paid its salaries in its own official currency and made it compulsory for taxes and other payments to the Government to be settled in Dutch guilders on the gold basis. For a long time, however, the Government was quite willing to receive payments and even to pay out in silver dollars, only with this restriction that the rates were calculated a little lower than the market rate of the day in order to induce debtors to pay by preference in Dutch currency; railway and shipping companies, shops and other private institutions did the same, with the result that everyone could pay everything with his silver dollars, be it with a small loss on the rate of exchange. For larger payments it was usual, in order to save this loss, to exchange dollars for Dutch currency with some native banker or at one of the exchange banks, and to effect the payment of taxes, etc., in Dutch money or Java Bank notes. The result was, for instance, that it was profitable for the Chinese lessees of the opium and salt monopoly to ship their dollars to bankers in Singapore and to buy Java Bank notes from these bankers at a better rate than that at which the Government would have accepted their dollars. Smaller payments, however, as for tickets on railway stations and for commodities in shops were usually effected in dollars, after a calculation from guilders, in which currency most of the companies' accounts were kept. Very few Dutch silver token coins were seen in circulation, but Java Bank notes were rather more common. Therefore, though prices were often quoted in Dutch guilders, actual payments were, as a rule, made in silver dollars, dollar bank notes, or dollar paper currency from the Straits. Every inhabitant had become familiar with this situation and with the calculation of dollars into guilders and of guilders into dollars.

When the Straits dollar, in which wages for coolie labour had as a rule been contracted and paid, was fixed at 2s. 4d. in January, 1906, the plantation companies and Chinese traders in Netherlands India, who did a large importing business with gold standard countries, urged the Government to expel all the foreign dollars as speedily as possible and to enact that the official Dutch money, which is fixed on a gold standard, should alone be tolerated. The monetary situation was accordingly reformed in Borneo in 1906-7 and in Sumatra in 1907-8 and every kind of foreign money was expelled to the entire satisfaction of everybody concerned: even of the Chinese coolies who were most accustomed to the silver currency! In the special conditions of China it would seem desirable to begin with intentionally admitting the co-existence of the old currency simultaneously with a new gold standard nucleus.

A STABLE GOLD UNIT

The problem is to provide a new gold unit and fix it beforehand at a certain value so that speculation on its future gold par will be excluded. There are three methods by which this could be done. The first would be by bringing into circulation a token coin of an intrinsic value much smaller than its nominal value. This, however, in China would certainly lead to extensive counterfeiting. As an alternative a new silver coin could be issued on a silver basis, but with an intrinsic value of ten to fifteen per cent. less than its nominal value, a tax equal to this difference could then be levied on the production of the silver mines and on all imports of silver in order to raise the price of silver bullion in the country to the same figure. There are, however, disadvantages. The margin of ten to fifteen per cent. might prove to be too small and a rise in the price of silver might compel a reduction of the fine silver content in the token coins. Furthermore there would be the danger of smuggling. The third and most satisfactory expedient would be to have a unit the nominal value of which would be equal to a certain weight of fine gold. This would ensure stability of contract and prices whenever quoted in this new unit. During the introductory period the new unit would only be accepted as a theoretical unit as, for example, the guinea in England and the yen in Japan. Later it might be advisable actually to mint a real coin in silver of the nominal value of this new unit.

The experience of the old Amsterdam Bank of Exchange (Amsterdamsche Wisselbank) and the Hamburger Giro Bank show how a theoretical or fictitious unit may be brought into capital use and become a real unit for the calculation of daily transactions though it be not minted into hard money. The former bank was established by the City of Amsterdam in 1609 to obtain a higher degree of certainty and stability in the settlement of financial transactions. Coins of all kinds and values, including foreign coins, were in circulation and the settlement of debts with distant due dates and of sales of foreign produce caused a great deal of trouble, since the creditor or seller never knew what actual value he was going to receive for his dues. The bank exchanged these various kinds of coins against the real currency of the country at the rate of the day, after deducting a small commission, but they also allowed their customers to be credited in the books of the bank with a certain amount of standard currency into which the different kinds of money paid in had first to be transferred, taking as a unit for their book-keeping the Dutch silver guilder of 10.58 gram fine. This bank guilder remained the unit long after the real coin had passed out of circulation, and the fictitious unit procured absolute stability to all payments. Credit balances were paid out in such coin as the customer wished to receive, the bank guilders being transferred into the kind of coins to be paid out. The

Hamburger Giro Bank was founded in 1619 on nearly the same principle. In China itself such a system is known, as the taels are fictitious units and the "Newchwang transfer" is actually a "bank unit."

A central bank of issue could take the initiative in introducing a bank unit for the whole of China. The bank would have to give its customers the opportunity of opening separate accounts in silver as well as in gold value. Those in silver would for the time being be based on one or other of the existing units, as dollars, silver bars, taels, etc.; the unit in gold will be the new fictitious unit which is based on a gold exchange system. As a matter of course the risk of a rise or a decline in the value of silver must remain entirely with the customers of the bank, since the banking institution could give no guarantee whatever for a stability of the price of silver; such a policy would lead the bank to a speculation in currency, which should under all cases be avoided. Therefore, if a customer brings his money to the bank, he will be credited in some silver account for the amount of dollars or silver bars paid in; and the bank will also pay out of this account in the same value, viz., silver dollars, silver bars, etc.

On receipt of instructions from its customers the bank would make transfers from one kind of silver account to another and it would simplify calculations and save expenses if the gold unit of account were used on such occasions. Transactions with a remote due date would acquire a greater stability if made payable at maturity in the fixed gold unit. The payment itself could if necessary be ultimately effected in silver on the silver basis. In this way the parties who originally transacted the business could begin and settle their business on a fixed gold basis even in a country where the only money in actual circulation is a silver currency (and of course copper) on a silver basis. By acting on these lines the bank would ultimately settle the silver transactions of its customers on a gold basis, though still in a very primitive way. The bank would also have to be prepared to make transfers in the fictitious gold unit from one account to another.

There would be several ways for a customer to create credit balances in such a gold account, viz.:

1.—To pay actual gold into the bank, either on the spot or abroad.

2.—To transfer certain gold values to the credit of the bank, with the bank's agents in one of the large gold centres, as London, Paris, Berlin, Brussels, Amsterdam, St. Petersburg, New York, Tokyo, Batavia, Singapore, etc.

3.—To negotiate a bill of exchange drawn on a gold centre abroad and payable in gold value.

4.—Through a transfer from the gold account of another customer.

5.—By selling to the banks an amount of silver dollars or silver bars with the request to credit the gold account for the equivalent. The bank could then accept this silver, with certain restrictions, either for the purpose of selling it in the market for account of its client, or of acquiring it for account of the government on behalf of the mint; or the bank may prefer to keep the bullion for its own account as soon as it saw its way clear to make purchases and sales of silver a part of its ordinary business without taking to silver speculations.

The Bank would be able to issue notes to bearer, their gold value being secured by offering a redemption in gold value abroad. Such redemption would of course only be for large amounts and private individuals would seldom hold so many of the notes, but they would find that the ordinary banks would be ready to act as intermediaries and this would no doubt be sufficient to maintain the parity of these notes with gold. It would be essential that no government paper money should be issued, but that the central bank should have the monopoly of issuing bank notes. If a fictitious gold unit could be established in China by this means these would be the great advantage that the figure at which the future real gold unit would be adopted would be known and speculations on the gold par and on the value of silver would be avoided. Also there would be the stability that would at once be offered to all contracting parties foreign or Chinese and those who act as sellers or lenders to China, and finally to the government itself. The government would no longer be in ignorance of the actual value of indemnities, salaries and other charges which it has to pay, and taxes it is about to levy. Every kind of business would be based on a fixed value which would no longer be affected by the shifting prices for silver.

The New Unit

The proposals of the Manchu Board of Finance for a new unit to be called a "Yuan," provided for coins down to one-thousandth part of a yuan, which shows that the yuan itself is already considered too large a unit. A large unit tends to raise the price of commodities, salaries, wages under its influence; the cost of living shows a tendency towards a higher level than in countries with a smaller unit. A new unit of one-third of the Kuping tael (instead of about two-thirds as in the case of the yuan) would have many obvious advantages. One of the most important would be that instead of nine kinds of subsidiary coins as proposed there would only need to be three, namely one-tenth, one-hundredth and one-two hundredth of the new unit.

It would be a very dangerous experiment for China to start with a gold exchange standard as a uniform system for the whole country as long as it is quite uncertain what is the real position and strength of China with regard to the balance of trade. Consequently as an examination in this regard would probably take several years it would be wise to postpone the adoption of the gold Exchange Standard as the only existing currency system and to invent a temporary scheme. If such a preliminary scheme could actually be made to operate it would mean the solution of a difficult problem: it would make it possible to adopt at once the principle of a gold or of a gold exchange standard, even before a token currency could be issued and to carry it into effect to some extent already from the first moment; but at the same time it would prevent an exhaustion of the gold stock and of the reserve of gold values, because the old reserves of silver coin and bullion, which it would maintain along with the new gold reserve, would still be especially qualified for the settlement of a temporary adverse balance. As a matter of principle a Gold Exchange Standard would have to be adopted from the very start with a unit of one-third of a Kuping tael, which unit at a silver price of 2s. 8d. would be equivalent to 0.3644883 grams of fine gold. The unit would be known to everyone, but as China is not in a position to stop counterfeiting on a large scale a silver token coin based on the Gold Exchange would not at once be issued. The unit would, however, be immediately used in the books of the central bank; and the other banks, foreign and native, would be earnestly requested to join in this policy. Bank notes would also be issued in the new unit by the central bank against:—*a.*—payment of coins, bars, or any kind of hard cash; *b.*—purchases of bills of exchange which are payable abroad in one of the gold centres, or of telegraphic transfers: in this way it would be possible to convert merchandize into gold; *c.*—credits opened in China against purchases of inland bills, or against advances covered by collateral security. There might be a fluctuation of about one per cent. or a little more on either side of the nominal value of the bank notes, but it is probable that the central bank would have no difficulty in maintaining a policy, whereby it could adequately control the circulation of its own notes their value being maintained by the foreign gold reserve.

The issue of token coins would be the second part of the reform. For reasons already suggested the unit would be one-third of a Kuping tael.

Comparing this coin with the shilling, the Reichsmark, the franc, the Dutch guilder, the Japanese half-yen and the rupee, we find the following figures :—

	gross weight of silver piece in grams.	fine silver content in grams:	equivalent in fine gold of grams.	giving ratio as from:
Proposed new unit	8.504727	7.6542543	0.3644883	21 :1
Shilling	5.65518	5.2310415	0.3661192	14.28 :1
Reichsmark	5.55555	5.—	0.35842	13.95 :1
Franc	5.—	4.175	0.290322	14.38 :1
Guilder	10.—	9.45	0.6048	15.⅝ :1
Half yen	10.125	8.100	0.3749962	21.6 :1
Rupee	11.663811	10.69182675	0.4882113	21.9 :1

The subsidiary coinage in silver, could be adopted at the corresponding contents of fine silver, but at a fineness of 800/1000. In that case the figures for the subsidiary silver coins would be :

	gross weight in grams.	fine silver content in grams.
½ unit, or 50 cent pieces	4.78125	3.825
⅕ unit or 20 ,, ,,	1.9125	1.53

It would simplify matters if these figures were also rounded off, to which there could be no serious objection, and to make them say :

4.75 grams gross weight and
3.80 grams content of fine silver, for the 50 cent piece.
and
1.90 grams gross weight and
1.52 grams content of fine silver, for the 20 cent piece.

This would no doubt make coins of a very handy size. It is doubtful whether gold coins would be actually required for circulation for some time to come, but, it would be necessary to keep the necessity in view from the very beginning. Two coins would be necessary, one of ten units, the other of twenty units. The twenty unit piece would have the same gross weight and the same fine gold content as two ten unit pieces.

Particulars of some other gold coins of approaching value are given in the following table:

	gross weight in grams.	fine gold content in grams.	fineness.
New 20 unit piece.	8.09974	7.289766	0.900
English sovereign.	7.98805	7.32238532	0.916⅔
20 Reichsmark piece	7.96495	7.16845	0.900
Dutch 10 guilder piece	6.72	6 048	0.900
20 franc piece.	6.45161	5.80645	0.900
10 yen piece.	8.33325	7.499925	0.900
U. S. $ 5 piece=½ eagle	8.359	7.523158	0.900

RECAPITULATION.

The following is a recapitulation of the main points of the proposed currency reform :

First Period

1. The very first step must be the adoption of a future gold unit as a foundation of the new system, in order to avoid speculation on the announcement of the gold par, and also to avoid that the new unit would later on have to be raised to its future nominal value.
2. The organization of a central bank of issue, or otherwise the reorganisation of the Ta Ch'ing Bank as a central bank for the whole country.
3. The introduction of the new gold unit as a money of account for book credits and book transfers.
4. Securing the co-operation of the foreign exchange banks and of the private Chinese banks and bankers for the introduction of the new gold unit into their bookkeeping.
5. The issue of bank notes based upon the new gold unit.
6. The accumulation of a gold reserve against the aforesaid bank notes.
7. The regulation of the management of this gold reserve.
8. Eventually declaring the bank notes legal tender.
9. To make a close study of the conditions of the balance of trade and of the balance of payments for China.

Second Period

10. The establishment of weight, fineness and alloy of the token coins and of the new subsidiary coinage.
11. The issue of these tokens coins and subsidiary coins, and simultaneously.
12. The accumulation of a gold reserve against the token coins and the regulation of its management.
13. If desirable : the coinage and issue of gold coins. Also, if desirable the temporary admission of some particular foreign gold coins as legal tender, and the temporary issue of gold certificates.
14. The proclamation as unlimited legal tender of:
    a. the silver token coins of 1 unit and 2 units ;
    b. the above mentioned gold coins and eventually the gold certificates.

Third Period

15. The gradual withdrawal and subsequent demonetization of the old silver dollars, as far as necessary of the old sycee and of the present copper cash.

CONDITIONS IN THE PHILIPPINES

MESSAGE OF THE ACTING GOVERNOR-GENERAL

The following is a summary of the Message of the Acting Governor-General of the Philippine Islands (the Hon. Newton W. Gilbert) to the Third Philippine Legislature, delivered at Manila on October 16:

GENTLEMEN : In the absence of His Excellency the Governor-General, it becomes my duty to send to you a message at the opening of the Third Philippine Legislature. Mr. Forbes is still detained at home by reason of impaired health occasioned by his arduous and unselfish service to the people and Government of these Islands. I voice with you the earnest hope that his health may be fully restored and that he may soon be able to resume the duties of the office which he has so ably filled for several years.

I congratulate you, and through you the Filipino people, upon the favorable auspices under which this Legislature begins its work. Tranquillity prevails throughout the Archipelago; progress in every line of endeavor has been marked throughout the year. We are beginning to see the beneficent results of the Government here instituted; results not attained by Americans alone or by Filipinos alone, but by the joint efforts of American and Filipinos, who have shown themselves interested alike in the progress and development of the people. It is but just to pay tribute to the able Filipinos, who, since the inauguration of the present. Government, have devoted the very best that was in them toward the accomplishment of all things which make for progress. Not in Manila alone, but throughout the Archipelago, may be found earnest and able men devoted to the cause of the people and fired with the highest ambitions for the material, mental and moral uplift of those about them. No wonder, then, that with limited revenues and conditions untoward in many respects the results of their labors and ambitions are marked to-day by a condition of well-being and opportunity heretofore unknown in the Philippine Islands.

The utterances of every President of the United States since American occupation have defined the present Government of the Philippine Islands as temporary: to exist only until such time as the Congress of the United States might determine that the Filipino people are prepared to establish a stable government. Although only eleven years have elapsed since the inauguration of civil government—and eleven years is indeed a short time in the life of a people—yet it may be to recount some of the steps that have been taken and something of the progress made toward the redemption of these promises and the culmination of the desires of a large part of the Filipinos.

The American people have regarded certain things as prerequisite to the fulfillment of these promises; universal education, general prosperity, ease of intercommunication, and a molding of all the elements into a homogeneous whole. What have we already accomplished in these directions?

First, a considerable increase in the development of the natural resources. Nature has been lavish in her gifts to these Islands. Modern methods, sufficient capital, and ample labor should make the Philippines as productive as Java, which, with a much smaller area, supports thirty millions of people. Already the exports and imports, which are a considereble index to the prosperity of a country, have increased more than 90 per cent. Wages have risen until they are double or quadruple the wages known before. Receipts in the customhouses have grown constantly year by year, and, while this is only the beginning, it has first a considerable number of the people with the ambition to make the Philippines the garden and granary of the East.

Second, a university has been established as the culmination of the educational system. It has been established upon a broad and liberal foundation. It is manned by capable professors and instructors and young men and women are being equipped to occupy the highest places in the social, industrial, and governmental life of the Philippines. This university has been liberally supported by the Legislature; but further appropriations must be made in order to place it fully abreast of the universities of other countries. The need now is particularly for buildings and equipment. I recommend that this Legislature provide for the construction of at least one other university building, to take its place in the central university group.

Third, a general educational system was inaugurated in the beginning. More than half a million children are attending school as these lines are written. For several years the average has been nearly as great, so that we can say that between three and four million students have had greater or less advantages in the public schools of the Philippine Inlands. Many private schools are also serving the people. Each year adds to the number of those of mature age who have received some school training. In these modern days every civilized country is developing in democracy. Whatever form this Government may assume, it must be based upon the democratic idea of a government by the people. It is not enough that a few people shall be educated in high school or university, but all should have sufficient general education to enable them to take an intelligent place in the electorate.

Fourth, means of intercommunication have been improved. In a country such as this, composed of many islands and these islands frequently divided by mountain ranges and almost impassable rivers, intercommunication has not been easy. Especially has this been retarded in the days that are past, because of the fact that there was no common language among the people, and so even if people of one section could reach the people of another they had small means of interchange of ideas. Railroads have been built, steamship lines developed, ports constructed, lighthouses erected, and, above all, the children in the public schools in remotest parts of the Archipelago have been taught the same language.

No superiority is claimed for the English language over others which possess literature and a history, except, perhaps, that it is so fast becoming the business language of the world, especially in the Far East, that countries leading in commercial and scientific endeavor have almost universally made its study a part of their public-school system. It is the only language which it was possible to teach generally throughout the Archipelago. Unfortunately, the policy of the previous sovereignty here did not permit the general teaching of the Spanish language, and so it was known by comparatively few. Inasmuch as the ability to use a common language is one of the essentials to the realization of the political aspirations of the Filipino people, it is important to see how far we have progressed in this direction.

At least three million children have had instruction in this tongue. Some of them have already reached manhood and womanhood, and are qualifying as voters because of their knowledge of this language. For many years English has been the official language in all branches of the Government except the courts. This, however, does not mean that the business of the Government has not been very largely conducted in Spanish and in the various dialects.

Until this time Spanish has been the official language of the courts of the Philippines, although under the law English replaces it in January next. Spanish has not been used universally; in fact, scores of languages are used in the courts. I myself had the experience, while sitting on the bench, of having six languages used in the trial of one case. I think this is not unusual. It is not possible, of course, to use English or Spanish or any other language exclusively in the courts. Many lawyers of the Philippines are not able to use English. Large numbers of justices of the peace and a few judges of the courts cannot speak English. Younger men who are being appointed to these positions now, as a rule, can do so. The Filipino has a genius for languages and readily acquires a new one when he chooses. I believe, however, that the Legislature should make provision for the use of Spanish in conjunction with English in the courts, in order that by no possibility will hardship or injustice be done any citizen.

HON. SERGIO OSMENA

Speaker of the Philippine Assembly

I recommend as earnestly as I may, not that the law be repealed which makes English the language of the courts and thereby postpone the achievement of Philippine desires for more complete nationalization (if I did this I should regard my action as contrary to the desires of the majority of Filipinos and should proclaim myself as an enemy of Philippine autonomy), but that the law be amended so that all safeguards may be provided so as to permit the judge or lawyer or litigant to elect whether in the particular case that is to be tried the proceedings or any part thereof shall be conducted in Spanish. If this recommendation be adopted, the steps already taken toward acquiring a common tongue will not be useless; young men educated in the public and private schools of the Islands will not be disheartened; those who by reason of age or disinclination have not acquired the new tongue will not be discriminated against; justice will be served in every particular, and the gradual adjustment of the language used in the courts will take place of its own force as fast and as fast *only* as the people who have business to transact in the courts are ready to adopt it.

LAW AND ORDER

A gratifying evidence of the development of a feeling of responsibility was given last July when the municipal police assisted by the citizens of Sariaya, Tayabas, repulsed the assault of a band of seventeen armed men upon the town. Too often in the past these armed bands have met no resistance, the people taking their raids as a matter of course; and the fact that the inhabitants of this town were willing to defend their property at the risk of their lives shows that a spirit of stern protection of one's property and individual rights is being developed throughout the Islands.

For its spread and for the protection of their property I earnestly recommend to your consideration legislation which will put permanently in confinement the large number of persons who support themselves by preying upon their fellows.

AGRICULTURE

The campaign against rinderpest has been prosecuted with unceasing vigor and its results are everywhere apparent. This disease is no longer a factor in the industrial economy of the Islands. It still exists, and in widely separated territory, but there are comparatively few cases and their number is constantly decreasing. I confidently expect that an end to the scourge of this disease, which has wrought such destruction to the prosperity of the Philippines, is in sight.

The chief danger now is the possibility of reintroducing rinderpest from abroad. For many years the Government made little progress in its efforts to stamp out the disease, because cattle, coming almost without restriction to the Philippines from the China coast, constantly brought disease into the Islands and no sooner was one epidemic under control than another was reported. It was only when a proper quarantine of animals from ports harboring disease was put into effect that any real progress in the way of ending rinderpest was made; and the most stringent quarantine regulations must be kept in force and scrupulously observed to prevent the landing of infected cattle. Those under which we are operating at present are that cattle from territory exposed to rinderpest must undergo quarantine in the bay for a sufficient length of time to enable the veterinarians to determine beyond any reasonable doubt that the shipment in question is not infected, although we might well follow the lead of the United States and other countries in absolutely prohibiting the importation of cattle from diseased ports.

Too much praise cannot be given the provincial governors and other officials, for their earnest coöperation in the work against rinderpest. Quarantines are restrictive and undoubtedly work hardship on the people. However, almost without exception, they have shown a disposition to cooperate when the necessity for the quarantine was fully explained to them.

In its work other than combatting animal diseases, the Bureau of Agriculture has just completed the most satisfactory year of its existence. Our efforts now are not so much to conduct scientific experiments as to bring to the knowledge of the people the facts and information which have been collected. This bureau will find its highest usefulness only when it is so thoroughly in touch with the people that it will encourage the farmer to raise two crops of rice a year rather than one, if two are possible; to double the output of his orange farm by grafting new and better varieties on his trees; to sell his hemp for much more by using better methods of stripping; to increase the value of his copra by proper curing; and so on indefinitely. To do this work, which is of fundamental importance to the prosperity of the Islands, demonstration stations are being established throughout the Archipelago as rapidly as money and men are available. I believe that this work should be continued and extended so that we will have at least one demonstration station in each province, the employees of which will be in the closest relations with the agricultural life of the community. To this end there is requested this year a considerable increase in the appropriation for the Bureau of Agriculture and I earnestly recommend it to your study and consideration.

ECONOMIC CONDITIONS

During the past twelve years there have been imported into the Philippine Islands more than 2,485,000 tons of rice, for which there were sent, largely in coin, to foreign countries a little less than P165,000,000. This, of course, is an exhausting drain on the resources of the Islands, and it is not now, nor can it for years be, offset by manufactures. To raise what we consume it will be necessary to increase our crops of grain in ordinary years between two and three hundred thousand tons.

There are in many parts of the Islands large tracts of the most fertile land suitable for the growing of rice or maize, which belong to the Government and which, up to this time, have never been cultivated. It seems to me that the Government might well engage in the development and cultivation of some of these areas. There are to-day many thousands of families engaged, as were their forefathers before them, in a hopeless struggle on small parcels of exhausted soil where they barely eke out an existence, contributing nothing to the wealth of the Islands. If they could be transferred from their present environment to these large, fertile tracts, their present negative influence upon Philippine progress would be changed and they would soon be contributors in their full share to the development of their country.

I desire to recommend to the thoughtful consideration of the Legislature a plan which attempts the development of some of these areas upon as large a scale as may seem wise, for the twofold purpose of increasing the food supply of the Islands and of encouraging immigation of people from the more populous and sterile districts into those parts of the Archipelago where nature has been most bounteous in her gifts. Such tracts of land may be found in various parts of the Archipelago, some of the best of them being in the Island of Mindanao; and I would like to suggest what seems to be sometimes forgotten, that the Philippine Archipelago consists not of Luzon and the Visayas alone, but of Luzon, the Visayas, and the Moro Province. Tracts may be found within the Moro Province which are easily accessible, below the belt of severe storms, requiring no irrigation, where two crops of rice may be raised each year, and where, if such a station were established, the influence of the more northern Filipinos would soon become a dominant factor. Let it not be said that the Philippines are dependent upon the outside world for food. Let this great drain upon the resources of the Philippines cease, and relieve the congestion and the consequent poverty which prevails in certain parts of the Archipelago. There is yet remaining P116,000 in the so-called congressional relief fund, which could well be used for this purpose if the Legislature shall determine that such a policy should be adopted. A considerable additional amount should be appropriated in order to give the proposal a real opportunity for success and to make the project of sufficient magnitude so that its beneficial results may be really felt.

I feel that this a matter of great importance, the purpose being twofold: that of encouraging interisland migration and of providing a larger supply of food for the people. I request your earnest and thoughtful consideration of the matter.

RAILROADS

Railroad construction has continued to progress steadily during the year in the Island of Luzon and the effect in stimulating industry and fostering production, especially in the copra-producing provinces, has been marked.

The Manila Railroad during the year has opened its lines to the following points; Candelaria, on the Manila Line South; San Jose to Batangas and Batangas to Bauan, on the Batangas Line; Pagsanjan, on the Calamba-Santa Cruz Line; Rosales, on the Paniqui-Tayug Line; Naic, on the Naic Line; and South Aringay, on the Dagupan-San Fernando, La Union Line.

ABANDONMENT OF RAILWAY CONSTRUCTION ON THE ISLANDS OF NEGROS AND PANAY

After a thorough study of conditions in Negros, our officials and engineers are conclusively of the opinion that at the present it would be highly inadvisable to permit the Philippine Railway Company to construct the railway proposed for that Island. It appears that the cost of construction would be approximately P8,500,000, with an annual interest charge of P340,000 which the company would probably not be able to meet and which the Government would consequently be called upon to pay. Similar conditions attach to that portion of the concession which provides for a railway from Dao to Batan Bay on the Island of Panay. The Philippine Railway Company is also of opinion that these two lines could not be made to pay for a long time to come and is ready to waive its concessions for them. Drafts of proposed laws to accomplish this purpose were submitted by the Committee on Railroads to the Assembly at its last session and will be found in its files as Assembly Bills Nos. 942 and 1057. I recommend them to your careful consideration, in order that we may not be called upon to meet this probable expenditure for which we would receive no compensating return.

EVIDENCES OF COMMERCIAL AND FINANCIAL ACTIVITY

The following figures are interesting as showing the increase in trade with the United States since the passage of the Payne Tariff Bill, 1909, the increase in trade with other countries, and the increase in both business and trade during the same period:

Fiscal year.	Trade with foreign countries.	Trade with the United States.	Total trade.
1909	P87,772,324	P29,905,556	P117,677,880
1910	94,387,348	59,183,832	153,571,.80
1911	105,959,292	73,265,410	179,224,702
1912	124,959,188	84,780,444	209,739,632

Business of the Philippine Islands upon which is levied a tax of one-third of 1 per cent:

Fiscal year.	Amount of business.
1909	P380,408,894
1910	457,610,200
1911	533,650,738
1912	574,168,706

These figures show a total increase in the three years of P189,501,874 in trade and P424,202,962 in business in the Philippine Islands. When the Payne Tariff Bill went into effect it was believed that there would be a marked decline in the customs receipts owing to the free American market which would tend to cut into the foreign markets, from which alone goods are received on which customs duties are paid. The contrary has proved to be the case. Customs receipts have advanced steadily the past three years, amounting to P16,572,147 in 1910, P17,357,620 in 1911, and P18,695,295 in 1912. Not only do the merchants import more and more from the free markets of the United States every year but with increasing prosperity the purchasing power of the people has become so much greater that they can afford to increase their purchases of foreign dutiable goods.

REVENUES

The customs receipts, which the Insular Collector of Customs at the beginning of the last fiscal year estimated would suffer a decrease of approximately a million pesos, in fact showed an increase of P1,271,452 over the previous year. The estimate of the Collector of Internal Revenue of an increase of about P600,000 over the receipts of the previous year proved very conservative, P1,189,669 being in fact the figure for the increase in his collections. The total actual revenue for the fiscal year was P27,275,668.61 instead of the estimated P25,072,300.

Up to date, in the present fiscal year the revenues from both customs and internal revenue have shown a regular increase, the figures for the first quarter showing an increase in customs receipts of P1,200,284 over that of last year and the internal revenue showing an increase of P352,700 over the corresponding period of the previous year.

FINANCES

The following is taken from the report of the Governor-General to the Commission and shows the financial workings of the Government for the fiscal year 1912:

The year was begun with P447,332.37 cash available for appropriation and P593,500 which, although appropriated from funds of the previous fiscel year for permanent improvements, was appropriated subject to release by the Governor-General. Therefore, the latter sum which had not been released was considered as actual cash available in the treasury and a portion of the reserve, making in all the sum of P1,040,832.37 cash reserve.

The estimated resources for the year were P26,326,989.31 and the estimated liabilities were P25,406,949.55. Of these liabilities P19,468,449.11 were for current expenses and P2,542,452 for permanent improvements. In all the grand sum of P6,501,192.42 was appropriated by the Legislature for permanent improvements from the funds available for the fiscal year 1912. As it was apparent that the finances of the Government could not stand such a large appropriation. P4,854,500 of this sum was appropriated subject to the release of the Governor-General. During the year the receipts from the customs and internal revenue exceeded the estimates, and P3,397,027.65 were transferred into the general fund of the treasury and made available for expenditure by the gold-standard fund Act. At the end of the year therefore P31,247,673.39 represented the revenues and receipts of the Government, an increase of P6,011,016.45 over the estimates.

Expenditures.—The total expenditures of the Insular Government for the fiscal year, were P30,208,761.50, as compared with P28,505,721.41 of the previous fiscal year, an increase of P1,703,040.09. Of this total amount, P29,786,832.55 was from the general revenue funds as compared with P27,988,227.38 of the previous year, an increase of P1,798,605.17, and P421,928.05 from the bond fund, as compared with P517,494.03 of the year before, a decrease of P95,565.08.

Current expenses.—The current expenses of the Insular Government for administration, operation, and maintenance were P18,768,317.27, as compared with P17,143,635.86 of the prior year, an increase of P1,624,681.41. This increase was due in large part to the increase in expenses incident to the opening of the general hospital, the salaries of the justices of the peace, the rinderpest campaign and the purchase of rice which accounts for P1,119,493.

Aid to provinces, municipalities, and cities.—During the fiscal year the Insular Government gave aid and contributions to provinces, municipalities, and cities, for their general administration, in the amount of P1,654,830.75, as compared with P1,664,727.03 of the previous year, a decrease of P9,896.23.

Interest and sinking-fund payments.—The fixed charges of the Insular Government on account of its bonded debt, being interest on the friar lands and public works bonds and the allotments to the sinking funds, were P900,773.97, as compared with P1,102,782.08 of the year before, a decrease of P202,008.11; P141,430.85 of this decrease is accounted for by a reimbursement payment during the fiscal year 1911 to the friar lands bond sinking fund.

Interest on railroad bonds.—Under guaranty contracts the Insular Government paid the net sum of P525,422.69 on railroad bonds, as against P766,946.65 for the year before, a decrease of P241,523.96 which is accounted for by repayments made by the companies during the last year.

Permanent improvements.—During the fiscal year the total amount of expenditure for permanent improvements was P8,359,416.82, as compared with P7,827,629.79 of the prior fiscal year, an increase of P531,787.03. Of this amount, P7,937,487.87 was from the general revenue funds, as against P7,310,135.76 for the previous year, an increase of P627,352.11, and P421,928.95 from the public works bond fund, as compared with P517,494.03 of the year before, a decrease of P95,565.08. Of the total amount from revenue, viz: P7,937,487.87, the sum of P4,259,378.52 was on account of Insular outlays, and P3,678,109.35 was allotted to provinces and municipalities.

Statement of receipts and expenditures, fiscal year 1912, and resources at the beginning and end of the year.

Resources, July 1, 1911:		
Cash on hand available for appropriation	P447,332.37	
Appropriated from revenue funds, fiscal year 1911, for permanent improvements, not yet released by the Governor-General	593,500.00	
		P1,040,832.37
Appropriated from revenue and available		9,926,931.34
Cash on hand appropriated from proceeds bond sale		701,487.08
Supplies on hand		5,510,862.15
Total resources, July 1, 1911		17,180,112.94
Revenues and receipts:		
Customs		P17,816,247.28
Internal revenue		9,459,421.33
All other receipts		3,972,004.78
Total revenues and receipts		31,247,673.39
Expenditures:		
Current expenses of the Insular Government		18,768,317.27
Aid to cities, provinces, and municipalities		1,651,830.75
Interest and sinking-fund payments—bonded debts		900,773.97
Interest on railroad bonds—guaranty contracts		525,422.69
Permanent improvements—Insular	P4,259,378.52	
Allotments to provinces and municipalities	3,678,109.35	
Total from general fund revenues	7,937,487.87	
Insular from bond fund	421,928.95	
Total for permanent improvements		8,359,416.82
Total expenditures		30,208,761.50
Transfers and adjustments of supplies:		
Supplies transferred to equipment (Bureau of Education)	P1,212,794.18	
Supplies dropped from account	40,191.13	
		1,252,985.31
Resources, June 30, 1912:		
Cash on hand available for appropriation	P1,404,689.95	
Appropriated from revenue funds, fiscal years 1911 and 1912, for permanent improvements, not yet released by the Governor-General	1,681,038.88	
		3,085,728.83
Appropriated from revenue and available		8,286,064.50
Cash on hand appropriated from proceeds bond sale		279,558.13
Supplies on hand		5,314,688.06
Total resources, June 30, 1912		16,966,039.52

Under the authority given by section 4, Act No. 1989, the Secretaries of the various Departments have authorized the use for permanent improvements of the following sums appropriated for current expenses:

1909	P260,673.72
1910	1,052,229.02
1911	503,388.36
1912	763,224.78

The estimates for the present fiscal year are as follows:

Fiscal year 1913.

RESOURCES.

Reserve:		
Cash available for appropriation June 30, 1912	P1,404,689.95	
Appropriated from funds of fiscal years 1911 and 1912 for permanent improvements by Acts Nos. 1988 and 2059 unreleased by the Governor-General June 30, 1912	1,681,038.88	
		P3,085,728.83
Estimated revenues		28,835,000.00
Total estimated resources		31,920,728.83

LIABILITIES.

Fixed charges		P2,913,288.44	
Permanent improvements:			
Continuing not subject to release by Governor-General	P1,000,000.00		
Appropriated fiscal year 1913, released by Governor-General	500,000.00		
Appropriated fiscal years 1911 and 1912, and released by Governor-General	1,098,985.27		
Current fiscal year 1913 appropriations, Acts Nos 2185, 2187, and 2189	434,000.00		
Restoration for irrigation systems from P750,000 reverted fiscal year 1912	250,000.00		
		3,282,985.27	
Current expenses:			
Continuing appropriations	P617,975.03		
Fiscal year 1912 appropriations and allotments	18,634,127.27		
Restorations of prior year reversions	814,677.10		
		20,066,779.40	
Total estimated liabilities			26,263,053.11
Estimated balance provided no further amounts are released or restored by the Genernor-General:			
Appropriated from funds of fiscal years 1911 and 1912 not yet released by the Governor-General, October 8, 1912		582,053.61	
Available for appropriation from the general fund		5,075,622.11	
			5,657,675.72

As shown by the foregoing statement, the estimated Insular revenue for the fiscal year 1913 is P28,835,000. The Collector of Internal Revenue estimates that the receipts of his office during the year will be P10,000,000, an increase of about P540,000 over the receipts of last year. The Insular Collector of Customs at P17,500,000, which is a decrease of about P316,000 from the actual receipts of last year.

The total appropriations and restorations for current expenses for the present fiscal year amount to P20,066,779, and the appropriations for fixed charges amount to P2,913,288. P1,250,000 of the fixed charges is the annual contribution of the Insular Government toward the expenses of the city of Manila, and P110,000 is its contribution toward the expenses of the city of Baguio. The other fixed charges are interest on bonds of the Insular Government issued for public works and permanent improvements and guaranteed interest on bonds issued by the railroads. The total appropriations for public works and permanent improvements for the fiscal year 1913 amount to P1,934,000, all of which are to be paid out of the current revenues of the present fiscal year. P1,500,000, of this are the continuing appropriations under Acts 1854, 1988 and 2059 for barrio school buildings, roads and bridges and irrigation systems. In addition, the sum of P582,053.61 has been appropriated for permanent improvements from funds of the fiscal years 1911 and 1912 which have not yet been released by the Governor-General.

The Commission in its exclusive capacity has passed appropriation bills for current expenses of P703,134.27 and for public works and permanent improvements P434,000.

INSULAR AUDITOR'S REPORT OF THE PROPERTY OF THE BUREAU OF PUBLIC WORKS.

The popular and ever increasing demand for good roads and public works of all sorts and the large appropriations made available at that time necessitated the very rapid expansion of the Bureau of Public Works in the years 1907 and 1908. The organization was badly prepared to meet this situation and although the engineering personnel was extended as rapidly as possible, the provisions for the proper handling of the property and accounting problems incident to the enormous increase of work were entirely inadequate. The then Director of Public Works realized the danger of this situation and requested the Insular Auditor to make the necessary investigation and to prepare an adequate system of accounting to meet the needs of the Bureau. From that time, until December, 1910, the accounting division was under the direct charge of the Insular Auditor, who was endeavoring to straighten out and systematize the accounts and the property affairs of the Bureau. In the meantime the lack of system necessarily increased the cost of operation of the Bureau and of the public works which were under way. In November, 1911, the Insular Auditor began an examination of the property of the Bureau, on which he made a report to the Chief Executive in the latter part of August, 1912. The result of this investigation shown that the property shortage in the Bureau of Public Works is considerably less than had been estimated by the Bureau itself. In view of the changes in the personnel since 1907 and the inadequate accounting system of the Bureau it is impossible definitely to place the responsibility for this shortage, and the Auditor so reports. It appears that probably the entire shortage occurred prior to the incumbency of the present Director of Public Works. This shortage will ultimately require legislative action, but as it appears that there may be much of the property of the Bureau in the provinces which has not been checked, orders have been given to make the utmost endeavor to locate it, and until this investigation is completed a definite recommendation can not be made.

LOANS TO RAILROAD AND TO PROVINCIAL AND MUNICIPAL GOVERNMENTS.

At its last session the Legislature, having before it the uniformly excellent results had from the loans made from various trust funds of the Government, passed Act No. 2083, which authorizes the investment of 50 per cent of the gold-standard fund in loans to provincial and municipal governments for periods not exceeding ten years for the construction of public works. It also authorized the temporary investment of one-half of such 50 per cent for periods not exceeding thirty months in loans to the Manila Railroad Company on approved security, in order that the construction of railway lines in the Provinces of Tayabas, Camarines, and Albay may be facilitated.

At this time the authorized investments aggregate P6,155,229.94 in provincial and municipal loans, and P700,000 in loans to the Manila Railroad Company.

The present policy of investing trust funds in loans to provincial and municipal governments has now been in practical operation for more than five years, and it may be stated without qualification that the results have been so uniformly advantageous as to confirm the wisdom of the legislation by virtue of which these investments have been made. It is noteworthy that in no instance has any provincial or municipal government defaulted in either principal or interest payments on these loans nor has any instance come to my knowledge in which the expenditure of the funds has failed to produce satisfactory results to the taxpayer.

AGRICULTURAL BANKS.

One of the crying needs of the country is to provide a way in which agriculturists can obtain money for financing their crops. This was brought to the attention of the last Legislature, which provided, by Act N. 2124, for the establishment of a mortgage bank in addition to the Government Agricultural Bank provided by Act No. 1865 In the first section of said Act is the provision that the franchise is granted, provided that "within the period of six months from the date of approval of this Act (February 1, 1912), which period may be extended to one year by the Governor-General if in his opinion there are reasonable grounds therefor, said Mauro Prieto and his associates shall organize a corporation in accordance with the laws of the Philippine Islands." Certain difficulties which apparently could not be overcome presented themselves to the organizers of this bank, so that they could not comply with the terms of the law. Request was therefore made on July 26 for an extension of six months within which the corporation might be organized. With the idea that this was a matter which properly should be brought to the attention of the Legislature, I extended the period until November first in order that if at that time the prospects of the grantees of this franchise being able to provide the necessary capital for this bank were not good, the field would be open for other possible investors and the Legislature could take such action as it might deem fit. I have the honor to place this matter before you and to recommend that earnest consideration be given to the question of the incorporation of a bank or banks for such purpose. It is my firm belief that everything possible should be done to encourage agricultural banks to incorporate in the Islands, and I invite you to thoroughly consider this matter.

THE SALES AGENCY.

The Philippine Commission on April 10, 1911, passed Act No. 2061, for the creation of a sales agency to facilitate the manufacture and sale of products of people under the exclusive legislative jurisdiction of the Philippine Commission. The work of organizing this agency and providing buildings, machinery and methods for conducting it has necessarily been slow and therefore we are only now ready to obtain results. With the establishment now of the School of Household Industries, with a large amount of enthusiasm being shown in many provinces for the development of these activities, with the instruction in many forms of artistic labor that is being given in the public schools, it seems that this agency, created for a much smaller purpose, might well receive the support of the Philippine Legislature and be made the medium through which to develop a large trade in products manufactured in the homes of the people at times when they are not engaged in their ordinary pursuits or by members of the family who are not otherwise employed. This should guarantee to the producer a more equitable share of the value of his labor. An appropriation of P50.000 by the Legislature, to enable the Sales Agency to undertake this work, would, I believe, result in great benefit to the people, and I recommend it to your careful consideration.

Wireless in the Philippines—The government is contemplating the erection of a large and up to date central wireless station in Manila. The station with all appurtenances is to cost in the neighborhood of P.100,000 and will be connected with all the wireless stations in the Philippines.

DEVELOPMENT OF THE LOAN SITUATION

The protest lodged with the Chinese Government on October 29 by the representatives of the eleven Powers at Peking, parties to the Peace Protocol of 1901, disapproving the action of China in hypothecating a portion of the Salt Gabelle which has been pledged as a whole for the repayment of the Boxer Indemnity, has caused the Government to review its action. According to Reuter's correspondent at Peking the Government regrets that its determination to pay monthly a portion of the Salt Gabelle revenue to the Chartered Bank, which was intended as evidence of good faith towards the supporters of the Crisp Loan, appears to have had the opposite effect. The Government acknowledges that the protest appears to be unanswerable and that if the protest is upheld China will find other security for the Crisp loan.

Major Barnes, representing Birch Crisp and Company has arrived in Peking to investigate conditions, and it is possible that he will learn much that was not quite clear in London.

In answer to a series of questions on the subject of the Chinese loan, in the British House of Commons, on October 28, Mr. F. D. Acland, Under Secretary for Foreign Affairs, said that the Imperial Government regarded the negotiations between China and the Six Power Group as being merely in abeyance. The Government was not prepared to support other parties desiring to lend money to China.

He added that the papers with regard to the negotiations by the Six Power Group would be laid on the table on the morrow, and that the Sextuple Group held that China was still bound by the agreement concluded on March 9 and reaffirmed on May 17.

The following is the agreement of March 9 referred to by Mr. Acland. It was exclusively published in the special Revolution Number of the FAR EASTERN REVIEW in April last, and is now reproduced as a matter of interest and for general information:

REPUBLIC OF CHINA
Office of the President,

Peking, March 9th, 1912.

To E. G. Hillier, Esq., C. M. G., Agent, Hongkong and Shanghai Banking Corporation, Monsieur Casenave, Manager, Banque de l'Indo-Chine, H. Cordes, Esq., Deutsche-Asiatische Bank, and Willard D. Straight, Esq., Special Representative, American Group.

Gentlemen:—

I am in receipt of your letter of to-day's date informing me that, having obtained the sanction of your Governments to advance to the Chinese Provisional Government funds for their urgent requirements, as stated in the letter of the 2nd March addressed to you by the Acting-Minister of Finance, your Banks are now prepared to hold at the disposal of the Chinese Provisional Government, against the receipts of the Ministry of Finance, the sum of Shanghai Taels One million one hundred thousand (Shanghai Taels 1,100,000) and I note the arrangements proposed for making this sum available.

It is understood and agreed,

1.—That the said advance of Shanghai Tls. 1,100,000 will be treated in conjunction with the advance of Shanghai Tls. 2,000,000 made in Shanghai to the Chinese Provisional Government on the 28th day of February last, and that sterling exchange for the same will be settled by the Banks in Shanghai to-day.

2.—That this advance of Shanghai Tls. 1,100,000 as in the case of the previous advance of Shanghai Tls. 2,000,000 above referred to, will be covered by delivery to the Banks, so soon as arrangements permit, of sterling Treasury Bills bearing date the 9th day of March, 1912, and for such amounts as, after being discounted at a rate to be arranged, shall yield the sterling equivalent of the said advance, the said Treasury Bills to be secured, subject to the existing charges, upon the revenue of the Salt Gabelle.

3.—That the Banks hold a firm option for the provision of the further monthly requirements of the Chinese Government for the months of March, April, May, June and possibly July and August which the Four Groups have already been requested to finance, against the delivery of additional sterling Treasury Bills on terms to be arranged.

4.—That in consideration of the assistance rendered by the Groups to China in the present emergency and of their services in supporting her credit on the foreign markets, the Chinese Government assures to the Groups (provided their terms are equally advantageous with those otherwise obtainable) the firm option of undertaking the comprehensive loan for general reorganisation purposes already proposed to them, to be floated as soon as possible, and to be applied in the first instance to the redemption of the sterling Treasury Bills aforesaid.

I hereby confirm the arrangements and conditions above stated, and request you to proceed immediately in accordance therewith.

I am, Gentlemen,
Yours faithfully,
(Signed) YUAN-SHIH-KAI
(Seal)

Some extremely interesting correspondence relating to the Chinese loan negotiations, including telegrams between Sir Edward Grey, Secretary of State for Foreign Affairs, and Sir John Jordan, British Minister at Peking, has been published as a Parliamentary paper. While this correspondence is too long to reproduce, and in any event mainly covers the ground we traversed in our October issue, it is interesting to note that the official account of the negotiations between Mr. C. Birch Crisp and the Foreign Office, differs materially from that given by Mr. Crisp in interviews and in the speech delivered at the meeting of the Anglo-Russian Bank. Mr. Crisp would appear to have given an undertaking which he did not carry out. This Sir Edward Grey states politely, but specifically. Moreover there is no reference in the correspondence to the alleged request for a letter from the Foreign Office to Mr. Birch Crisp intimating that for "reason of state" he had better not proceed with the loan. There is, consequently, reasonable ground for doubt whether Mr. Crisp's memory was not defective in this, as in regard to the undertaking he gave to the Foreign Office on September 10.

At the movement of writing there seems to be a fair prospect of a *modus vivendi* being arrived at, between China and the Six Power Group, but as the situation changes almost daily it is, of course, possible that matters will wear a different aspect when this number of the FAR EASTERN REVIEW is published.

TIMBER

Zamboanga Timber Concession.—A concession of timber land containing approximately 60,000 acres was granted on Oct. 31 by the bureau of forestry. The tract is situated in the district of Zamboanga, Moro province, on the north coast of Dumanquiles Bay. The concession is in the form of a twenty year exclusive license agreement. Machuca Go Tauco, of the Manila Saw Mill, was the successful bidder who was awarded the privilege.

Ambos Camarines Concession.—Acting Director of Forestry W. F. Sherfesee has announced the granting of a new timber concession in the Philippines, which, under certain conditions, will involve a capital investment of not less than P.1,100,000. The forest tract is situated in the provinces of Tayabas and Ambos Camarines, bordering on Ragay Gulf. It was advertised for competitive bids several months ago, and the award was finally made to Mr. E. J. Lane who has associated with him in the enterprise capitalists and timber operators in British Columbia and in the northwestern part of the United States.

FAR EASTERN RAILWAYS

RAILWAYS IN THE PHILIPPINES

Annual Report of the Supervising Railway Expert.

The report of the supervising railway expert for the fiscal year ended June 30, 1912, indicates a total of construction on all railway lines for the year of 54.3 kilometers graded, 70.3 of track laying, and 105.1 of line opened. The total represents activity on the Manila Railroad Company's lines as on the Philippine Railway Company's lines, construction was. practically, closed in March, 1912.

The total kilometrage of lines in the Islands authorized constructed amounts to 1,785 kilometers; constructed and in operation, 1,034 kilometers; constructed and not in operation, 16 kilometers; to be constructed 734.

The Manila Railroad Company has an authorized kilometrage of 1,306, all of which is in Luzon. Of this 725 kilometers have been constructed and in operation; 16 kilometers have been constructed and not in operation at the end of the fiscal year, and the company has 564 kilometers to construct.

The construction on the Baguio line from Aringay included grading from the Aringay end for 10 kilometers and for seven kilometers from the Baguio end. On this line twelve kilometers of track will be required.

On the main line south a considerable portion of the location between Lucena and Callauag, Tayabas, on the east coast was completed in 1912. On June 30, construction was under way at Hondagua, the east coast port of Lopez. A grade of 1.2 per cent has been obtained between Lucena and the Gulf of Ragay and beyond that point to Nueva Caceres it may be impossible to secure so light a grade.

To complete its line as per contract the Manila Railroad Company will have to lay 91 kilometers of track yearly as the date of completion is 1918.

Bonds to the total of $2,996,000 for the southern lines of this company were approved on July 1, 1911, and again on October 18, 1911 additional certificates to the amount of $940,000 were authorized and on January 22, 1912, $1,000,000 were authorized making a total of $4,936,000 U. S. currency. These bonds cover 229 kilometers of line in full commercial operation and represent a cost per kilometer of about P43,110 or $34,688 U. S. C. a mile. Since 1910 net earnings on the southern lines of the Manila Railroad Company have been sufficient to pay all fixed charges and leave a considerable surplus to the company.

On the Northern lines there were 441 kilometers of track in operation against 409 in 1910. For the calendar year ended December 31, 1911, the operating revenue amounted to P2,833,047.81, an increase of P338,362 over the previous year while there was only an increase in track of 32 kilometers. The operating expenses amounted to P1,257,158.20, an increase of P184,186.73. The percentage of operating expenses to gross operating revenue was 45 against 43 for the previous year.

The equipment was increased during the year by eight third class passengers cars, three combination coaches, 76 freight cars, while there was a reduction of 29 company service cars. The equipment included 64 locomotives, 156 first, second, third combination and parlor cars, 770 freight cars and 127 in company's service.

On the Southern Luzon lines of this company there were 111 kilometers in operation on December 31, 1910, and 128 in operation on the last day of 1911. The operating revenue amounted to P761,850 for the calendar year ended December 31, 1911, an increase over the previous year of P559,980.

The operating expenses amounted to P409,266.53, an increase of P218,124 and the percentage of operating expenses to gross revenue 46.3 as against 67 the previous year, a reduction of 20.7.

The equipment of the Southern Lines was increased by five locomotives, 13 passenger cars and 51 freight cars during the year. The equipment now comprises 26 locomotives, 59 passenger cars of the different classes, 241 freight cars and 124 in company's service.

The Philippine Railway company's lines in Cebu represent an outlay of $3,317,000 or a cost of $69,394 a kilometer or $55,842 a mile. The line in Panay cost to the end of the fiscal year $5,065,000, $87,102, a kilometer or $63,645 a mile. The average cost a kilometer for the roads on both islands was $79,113 a kilometer or $63,645 U. S. C. a mile.

At the end of the fiscal year 1912 the government had paid out in interest on the guaranteed bonds of this company, P2,241,828. Of this amount there has been returned from the net earnings of P47,691, leaving a balance due the government of P2,194,136. Another payment of P58,073 was made since the completion of this report.

This railway operates 98.83 kilometers in Cebu and 118.74 in Panay, a total kilometrage of 217.57.

The operating revenues amounted to $773,940.90 and the operating expenses P596,848.40 leaving a net operating income after paying taxes of P179,799.

The total fixed charges including interest, betterments, reserves amounted to P734,439.55 showing a corporate deficit of P554,640.34.

The equipment for the lines was increased by five passenger cars and 37 freight cars. It now consists of 15 locomotives, 50 passenger cars, 192 freight cars and seven cars in the company's service.

THE REPORTED BELGIAN RAILWAY LOAN

Much speculation has been caused by the announcement of the arrangement of a loan for £10,000,000 between the Chinese Government and a Franco-Belgian syndicate for the construction of a railway between Honan-fu, the present terminus of a short line running east to Kaifeng-fu, and Sian-fu, with an extension north-westwards to Lanchow-fu, capital of Kansu Province, and an extension eastwards from Kaifeng-fu to the present undeveloped port of Haichow-fu on the coast. Such a line would cross the Pukow-Tientsin line about Hsuchow-fu, following the old bed of the Yellow River from near Kaifeng.

A Chinese Company has already constructed about thirty miles of line to the westward of Honan-fu, and it is practically ready for traffic. Thence the line will strike to Kansu and traverse some of the richest agricultural land in China. At present all merchandise is borne on mule back, and so difficult are the unkept routes through the loess and over the mountain passes and so great the traffic that the caravans suffer continuous heavy losses in animals. The bleaching bones of mules mark the whole way to the western country.

The region is described as the Switzerland of China, and possesses remarkable scenic beauty, as well as abundant material wealth.

The engineering difficulties all appear on the western section of the line. To the east of Kaifeng there are practically none. It is level country, with a route already marked by the old Yellow River. On the west any line will no doubt take the old cart road towards Shensi, by way of Tungkuan, across the province by Sian-fu, and up the valley of the Wei river. Carts travel about 1,000 miles from Honan by this route.

This line has been on the tapis for a long time, and the Compagnie Générale de Chemins de Fer et de Tramways en China, the Belgian organisation now negotiating for it, already had it laid down in the contract they entered into with China for the construction of the railway from Kaifeng to Honan, that they should have the option to make a loan for a line to Singan-fu, and that would surely lead them to bend every effort to acquire the right to build to Lanchow-fu and onwards. In Article 23 of that agreement it is set forth that "Should the Compagnie Générale de Chemins de Fer et de Tramways en Chine finish satisfactorily the work for the railway from Kaifeng-fu to Honan-fu, complying strictly with all the provisions of the present contract, and should the Chinese Government decide to extend the railway from Honan-fu to Singan-fu the Director General of the Imperial Chinese Railway Company agrees to come to an understanding preferably with, and to grant an option for the loan necessary for the said undertaking to, the Compagnie Générale de Chemins de Fer et de Tramways en China in conformity with the provisions and conditions of the present contract."

Nothing definite has been disclosed as to the terms of the new agreement. It is stated, however, that £2,000,000 was to have been paid up and that the money was to have been used by China for administrative purposes and not for the construction of the railway. Such an action would necessarily invoke a protest from the Governments of the countries wherein the bonds would be offered, and France did not hesitate to issue a notification that the loan would not be permitted to be listed on the Bourse. This precaution on the part of France in itself seems to have delayed the conclusion of arrangements.

With regard to the building of the section to the west of Honan-fu, mentioned above, it is interesting to note that it is portion of a section being built to Jung-kwan—the contract for the supply of the materials, bridges, equipment, workshops, &c., delivery of which commenced nearly two years ago, being held by Griffiths, Beddoes and Bray, Ltd.

The road-bed laid for some 30 miles from Honan-fu is being constructed entirely under Chinese supervision, Mr. Jeme Tien Yu acting as consulting engineer on behalf of the company, no foreign control being allowed. The cost of construction is being met out of the proceeds of an extra charge on the Chang-Lu salt likin authorised by Imperial edict. Several millions of taels have been collected from this source during the past three or four years, and expended on the construction.

"It is impossible" writes a representative of the contracting firm, to a London paper, "That the Belgians can obtain security on this section of the railway without reference to us, as we hold a first mortgage on the rolling stock and also a lien on the salt likin set aside to meet the expenses of construction.

"There appear a number of financiers anxious to enter into loan arrangements in China, who are satisfied with securities which have already been hypothecated, and it behoves merchants who have entered, into agreements with the Chinese under the old Manchu regime to keep a wary eye on securities that have been pledged to them."

As bearing on the above the following advertisement which appeared in the north China papers in November, and will be found in our advertising columns, is of interest:—The Chinese Government hereby reminds the Public that the Lotung Railway Company (商辦洛潼鐵路公司) holding the concession for the building and working of a railway between Honanfu and Tungkwan is a private concern whose business transactions, viz the engagements of the company relating to the purchase on credit of material and supplies for this railway, not having been approved of by the Chinese Government the latter in no case hold themselves responsible for same.—The Ministry of Communications, Peking.

The *London and China Express*, in referring to the proposed loan, says:—It would appear that an old-standing agreement with the Belgian syndicate for the construction of a railway from Honan to the west has been revived. The loan will not be issued until next year. The actual date of the signing of the agreement was Sept. 18, and in one of the clauses thereof Belgium, in consideration of the concession for the two proposed lines just mentioned, agrees to cancel the concession granted in 1903 for the Pien-Lo line. The proposed lines, which are of great commercial importance, will be longer than the Peking-Hankow system. The Assembly has sanctioned the loan, and expressed its confidence in Belgian ability to bring the work of building the lines to a speedy conclusion.

In connection with the proposal to make Haichow a port (which desire on the part of China is to have a port of her own which may in a measure counteract the growing influence of Tsingtau) it is interesting to note that German authorities observe that unless a colossal amount of expenditure is defrayed for a period of at least twenty years to come, Haichow will scarcely make as much advance as Tsingtao, and thus the German interest will in no way be effected by the construction of the line. Nor, they declare, will the Tsingtao line, if extended in future, run counter to the interests of the Chinese railway, since Germany has at present no intention of constructing any railways in Shantung Province.

KIRIN-CHANGCHUN RAILWAY

The Kirin-Chungchun Railway was opened for passenger and goods traffic on October 21st last. As its name indicates this line connects the city of Kirin, the capital of Kirin province, Manchuria, with Changchun, the point of junction of the Japanese and Russian systems in Manchuria.

The railway is 78 miles long. By the treaties between China and Japan signed in 1907 and 1908 the Japanese Government was to furnish 2,150,000 *yen* through the South Manchuria Railway Co., as a portion of the estimated expenditure. Japan was also to nominate the chief engineer and head treasurer, while the entire management was to rest with the responsible general manager appointed by the Chinese Government. The exact figures are not yet available, but it is believed that the line cost about 4,000,000 *yen*. The Chinese Government has consequently contributed about 2,000,000 *yen*, or roughly one-half towards the cost of construction.

Kirin is the greatest lumber market in Manchuria. There are no other towns of importance on the route, but it is confidently expected that the trade developed with Kirin will justify the construction of the line. Kirin is situated in the middle of a great forest region—the northern spurs of the Chanpaishan—and is served by the Sungari River. A steamer service is maintained by the Chinese Eastern Railway; connecting with the railway at Taolaichao, which is about midway between Harbin and Changchun. The new line will prove one of the most important feeders of the South Manchuria Railway. The Russian line may benefit to some extent as the Russian station of Kuanchengtsu is very close to the Changchun station of the Kirin-Changchun Railway, but there is the disadvantage that the new line is of the standard gauge (as is the South Manchuria Railway) while on the Russian line the 5 feet gauge obtains.

The interlineal connecting service between the South Manchuria and Kirin-Changchun Railways, in the shape of a 2½ mile section between the S.M.R. Changchun Station and the K.-C.R. Toutaokou Station, was recently completed. As the case was with the connecting service between the Chinese Eastern and the S.M. Railways, the S.M. Railway undertook to construct that part of the connecting line which runs in its own Railway Area, the remainder extending from the boundary line of the Railway Area to Toutaokou Station having been built by the Kirin-Changchun Railway.

In the old days the journey from Changchun to Kirin took from three to four days, but now the journey can be done in six hours. The station at Kirin is some two miles distant from the east gate of the city, but a very good road has been made by the Board of Works under the supervision of a British engineer. This road passes through the International Settlement, which lies between the railway station and the east city wall.

It may be mentioned that the expenses in connection with the construction of the line were found to be greatly in excess of the original estimate. Mr. Fu was the first Chinese Director General appointed and was succeeded by Li Fen-nien and later by the present Director General Sun To-yui

The *Manchuria Daily News* says:—Opinions vary as to the actual value of this new railway as a carrier of goods.

The more optimistic observers seem to expect a great deal from the complete opening of the line.

One of them remarks as follows:

"At present two or three carloads of lumber are being sent out from Chiuchan Station 8½ miles west of Kirin. The export will become much brisker when the Sungari siding is finished, and is expected to increase to 10,000 tons, worth Y. 400,000, a year.

"Next to lumber comes tobacco leaves. They used to be carted all the way to Changchun, whence the Chinese dealers forwarded them to Mukden, and thence to China proper by the Peking-Mukden Line. The necessary decrease in the cost of transportation as a result of the completion of the new railway, will quicken the export of tobacco leaves and a conservative estimate puts it at 1,500 tons valued at Y.100,000 per season. A carload of tobacco leaves was despatched from Kirin by train on the 25th Oct. This is taken for the beginning of the coming brisk season which was opened in earnest about the 10th Nov., and will last till next March.

"Then come medicinal herbs which are mostly destined to Yingkou and are expected to amount to 550,000 *kin*. Hemp is exported to Mukden and Yingkou to the extent of 23,000 *kin*. Fungi are another important article of export, and find their way chiefly to Kaiping.

"The country lying to the east of Maanshan is a splendid cereal zone productive of beans, kaoliang, millet, &c. Kalunchieh is expected to despatch 10,000 *koku* of Beans, Inmaho 20,000 *koku*, Hsiachiutai 10,000 *koku*, and Yingchengtzu 30,000 *koku*.

"Speaking of imports to Kirin, Cotton yarn and cloths constitute the most important items. About 80% of imports go from Yingkou.

The S.M.R. Co. Mining Department is opening an agency at Kirin to exploit a new market there for Fushun Coal."

ANTUNG-MUKDEN LINE

The line stretching between Antung and Mukden was a light railway, 2′ 6″ gauge, built originally by the Japanese Extraordinary Railway Corps during the Russo-Japanese War for a distance of 188 miles and 7 chains. Later, by virtue of the Sino-Japanese Agreement, Japan was authorized to alter it to the standard gauge of 4′ 8½″. The work was started in August, 1909, and the whole line was opened to traffic on November 1st, 1911.

The distance between the two cities, when reconstructed, was reduced by about 18 miles and 5 chains. In former days, goods were sent from Antung to Chiknan Shan twenty-one tons having been the maximum limit of the carrying capacity. At the latter place they were transshipped to 5 or 6 small freight cars and forwarded to Penhsihu, where they were transferred to larger goods cars and then sent to Mukden. In case of shipping goods from Mukden to Antung, the order was reversed. The trouble incurred was not the inconvenience to shippers, for several days were taken in transportation, to say nothing of the expenses that had to be incurred. Since through traffic was opened between the two points by means of the broad gauge the carrying capacity of the lines has been considerably increased, and the time taken for transportation has been reduced, whilst the expenses has been cut down to almost one half of the former rate. As it is, goods to be transported by this line are gradually increasing in quantity. Those articles imported to Mukden from Japan come by way of Dalny instead of utilizing the new railway, for reasons of freight and other matters.

Relations Between Important Korean Towns and Mukden

The principal articles imported to Mukden from Chosen are rice, skins, leather, bristle, hemp, cigarettes and salt fish. The importation of the articles has come to show a marked increase since the opening of the through traffic. For instance, Yalu lumber was being shipped formerly from Antung to Dalny and Yingkow by oversea routes and thence to Mukden, but now it is directly sent by the railway.

As to exports, a very few articles such as millet, kaoliang, cigarettes and cotton textiles were sent out from Mukden, but now Fushun and Penhsihu coals are being shipped to Korea by the Antung-Mukden Line. But Korea being an agricultural country like Manchuria, trade between the two regions is inclined to be limited to certain special goods. Be that as it may, as the result of the railway having increased its carrying capacity and reduced the cost of transportation the consumption of Penhsihu coal has been extended all along the line and it has give great facilities to the iron manufacturing business at Miaokou. On the other hand, a large quantity of fuel, charcoal *mufen* (material for joss-sticks) are now sent to Mukden from Chiaotou, Nanfen, Hsiamatang, Lienshankwan and Tsaohokou so that prices on these goods have been greatly reduced at Mukden.

Increase of Passengers

Travellers from Japan, who journeyed to Manchuria, proceeded by way of Dalny in former days, but now they cross the channel from Moji to Fusan, and then by taking the Chosen Railway go straight to Mukden. In the same way, passengers from Mukden take the same route. Since it is said that the number of passengers taking advantage of this line does not amount to one tenth of those journeying by the Dalny Line, however, traffic between the latter port and Japan seems to feel little difference on account of the opening of this line.

ARTICLES OF THE SZECHUAN HANKOW RAILWAY

After some negotiation between the representatives of the Szechuan provincials and the Ministry of Communications, the policy of government ownership of the Szechuan-Hankow Railway has been agreed upon, says the *Peking Daily News*. The terms, which have been regarded satisfactory and accepted by both parties concerned, are:—

(1) The Szechuan-Hankow railway shall be owned and managed by the Central Government.

(2) Whatever sum is left in the Szechuan-Hankow Railway Corporation shall be returned to the shareholders and be devoted to the development of industry in Szechuan.

(3) The Central Government shall be responsible for the payment of the labour cheques issued and the arrears to be paid to different concerns through which materials for construction were bought by the Corporation.

(4) The Ministry of Communications shall be responsible for the annual expenditure of the railway construction, for which expenditure the Ministry may issue shares bearing interest of six per cent. per annum.

THE TIENTSIN-PUKOW RAILWAY

The following is the report of the Japanese Commercial Commissioner on the effect of the Tientsin-Pukow Railway on the trade of North China:—

The Tsinpu Railway which is the connecting main line between Tientsin, N. China, and Pukow opposite Nanking is 628 miles in length, and is divided into two portions by the Grand Canal.

The Southern Section which is 233 miles in length extends from Pukow to Li Kuo which is situated on the Southern bank of the Grand Canal and was built by British engineers with capital found by British capitalists. The Northern Section which is 389 miles in length extends from Hanchang to Tientsin and was constructed with German capital and by German engineers, and the celebrated bridge across the Hwang Ho which was completed recently is such that trains will be running very shortly over it and when the express service is once inaugurated it is estimated that the journey from Pukow to Tientsin will occupy but 33 hours.

The most important stations on the Southern Section are Chuchou, Linhuikuan, Pengfou, Suchou and Hsuchou,

The goods which find their way into the Huai Ho Valley, and their way into the markets from the Huai Ho Valley, concentrate on the stations of Penfou and Linhuikuan and as the land to the north of this valley is not only level but very arable it is safe to say that there will be an expansion of agricultural products in the future.

The region in the vicinity of Hsuchou is mountainous and is very highly mineralised. The Grand Canal comes into Weishan Lake at Likuo and the Canal is crossed by the railway line between Likou and Hanchuang, but at the present time there is no market there and no connection between the waterborne and railway carried traffic.

NORTHERN SECTION

The Northern Section of the railway on the other hand passes in the vicinity of many important towns and a branch line has been constructed from Lincheng to Tsaochuang, its principal duty being the carriage of coal.

The following large towns lie along the line of the Northern Section, Kunchou, Chufu, Tsinan and Lokou.

From the Southern portion of the Province of Shantung to the city of Tsinan-fu the country is very mountainous: from the North of the Hwang Ho to the city of Tientsin the country is generally flat but this part of the country is distinctly lacking in facilities for water transport and is unirrigated.

Economically speaking, the Railway can be subdivided into three spheres of influence, the first being the Nanking sphere, the second the Tsingtau sphere and the last the Tientsin one which starts at Techou, and it is noticeable for certain reasons that this last named sphere is not used to nearly the same advantage as the two first named.

Goods which are for transport by the railway are classified under three headings, i.e. first, second and third class goods.

The following are considered as first class goods:—

Metals and metal ware, provisions, (except second class goods, tobacco, oils, tools, porcelain, stationery, silks, imported cotton piece goods, woolen fabrics, clothing, toilet accessories, dyes, hides, leather, skins, plants, seeds, raw cotton, straw braids, drugs, candles, etc.

Second class goods are as follows:—

Wrought iron, nails, lumber, pottery, tiles, vegetables, bricks, fish, native cotton piece goods, cotton yarn, cereals, etc.

Third class goods are as follows:—

Granite, coal, lime, manure, animal bones, empty cases, gunnies, etc.

Freight rates are the same throughout the whole length of the Southern Section of the line and are for first class goods 5 cent per 1 ton per 1 mile, for second class goods, 3 cent per 1 ton per 1 mile, for third class goods, 1½ cents per 1 ton per 1 mile, and for dangerous or hazardous cargo, seven and one half cent per one ton per 1 mile, but if the picul rates are used they come to about one-tenth of a ton.

The Northern Portion of the line is divided into three sections which are from Tientsin to Sangyuang

from Sangyuang to Lokou
from Lokou to Hancheng

and the various freight rates on these sections are as follows:

	1st Sect.	2nd Sect.	3rd Sect.
1st Cl.	3 cents	3½ cents	5 cents.
2nd Cl.	1.6 cents	2.25 cents	3 cents.
3rd Cl.	1.2 cents	1.25 cents	1.5 cents.

For dangerous or hazardous goods 7.5 cents.

Owing to the great competition with water traffic that the first section has to meet there has been a substantial decrease in freight rates.

FREIGHT REBATES

It is not known what rebates in freight are given on the Northern Section but large shippers are given rebates in the Southern Section.

For first and third class goods if shipped in quantities requiring the use of a 20 or 30 ton car exclusively 15 per cent. rebate is granted, and 33 per cent. discount is given on foodstuffs, cereals and beans. For salt there is a discount of 25 per cent. and for all other second class goods 10 per cent.

The Southern section has an arrangement with the forwarding agencies whereby shippers of $28,000 of freight will receive at the end of a year a rebate of 7 per cent., shippers of $48,000 a rebate of 10 per cent., and shippers of $90,000 a rebate of 13 per cent., for which they are expected to provide and own godown accommodation of the value of $20,000 at least, but if they have accommodation of a less value than this their rebates will be reduced to 5 per cent., 7 per cent. and 10 per cent. for similar amounts of business.

Likin stations as administered under the old system are still in existence along the line, but at Pukow, the southern terminus, there is no likin office and goods which are actually transported by the railway company at the present time from Pukow to Tientsin are in the very favourable position of not having to pay any inland taxes whereas the goods that follow the same route overland have to pay at the various barriers the likin tax.

The goods which are exported from Eastern Honan, Northern Anhuei and Northern Kiangsu which go to the southwards by the Huai Ho Canal still have to pay the heavy likin so that they are now sent to Pukow by rail from Penfou and Sinhui-Kuan.

With regard to goods exported or imported in the Shantung province along the railway line the likin barriers exist only in Luankou and the districts along the Yui Ho Canal and goods entering the province through Tsingtau are not required to pay the half duty that is customary in other treaty ports and as the extensions of the Tsinpu Railway are made so will the trade between Tsingtau and the interior of Shantung prosper.

In the district between Tientsin and Taokouchen in Honan which is served by the Yui Ho Canal there are a large number of Likin stations in the following places:—

Tientsin, Yangliuching, Tuliu, Techou, Linching, Lungwangmiao, Chuwang and Taokouchen.

The goods from these districts are subject to heavy taxation before they are sent to the railway and the only places where goods can be brought to the railway free of taxation are Tsaiyuan and Techou.

At the time of writing, the Railway authorities having investigated this matter, and negotiations are proceeding with the Central Government with a view to having these taxes considerably reduced if not abolished, so as to give the Railway a fair chance.

EFFECT OF RAILWAY ON CHINKIANG

The Chinkiang trade sphere may be said to include the whole district North of Yangtse River. Formerly the trade of the valley of the Grand Canal to the southward of Tsining, in Shantung, and the trade of Northern Anhuei and Eastern Honan where the main stream and tributaries of the Huai Ho passed through and served, concentrated on Chinkiang.

Since the building of the Tsinpu line and its advantages to trade, the produce of the district about Soochou in North Kiangsu, and the country round Liuhuikuan will inevitably use the line, and the junks that have been in the habit of using the upper reaches of the Huai Ho in the past will all concentrate on Linhuikuan and Pengfou.

The goods that are under transit pass, and thus exempt from inland taxation, about which time is not the great and important consideration, will, as before be carried by water and will be transported to Chinkiang, but the goods which are subject to taxation from Northern Anhuei and other places before mentioned, will be concentrated at Nanking and Pukow for railway transport.

The natural result of increased prosperity in the carrying of railway goods will probably decrease the junk traffic very much and will decrease the number of junks calling at Liuhuikuan although at the present time most of the goods that are carried under transit passes and are thus exempt from inland tax are still carried by junk, and the decrease in junks will mean the increase in freight rates by the junk owners which will cause even more cargo to be driven into the ever open arms of the enterprising railway officials.

Owing to the fact that most of the transactions in both Chinkiang and Shanghai in export cargo are for hard cash, rapidity of transport is of more importance than rates of freight and this also is causing an increase in the carrying trade of the railway.

The principal classes of goods that will be affected in consequence of the reasons we have explained are, cotton piece goods, silks and miscellaneous goods. As has been explained above, it will be easily seen that the imposition of likin and the tightness of the money market are two causes which specially affect the trade to the north of Chinkiang, but this tightness in the market will gradually disappear as order is restored in the interior.

The future prosperity of Chinkiang will to a large extent depend upon the gradual abolition of the Likin barriers altogether but no matter what the future of Chinkiang may be, the future of Pukow and of Nanking, Hsiakuan is bound to be good through the opening of the Railway.

Lately the Shanghai Nanking Railway authorities have suggested to the produce people to ship their produce by the Tsinpu Railway to Pukow and thence by the Shanghai-Nanking Line to Woosung, because beans and sesamum seed sent by this method of transport will come to Shanghai in two weeks earlier than it sent via Hankow or by junks as has been done in the past.

Of course if the produce shippers adopt this suggestion it will have a very bad effect on the trade of Chinkiang.

The trade of Chinkiang of late is only about 30 per cent. of what it was a while ago, but this is due chiefly to the danger of shipping goods owing to the internal disorders which have beset China in the past year or so, and to the tightness of the money market, and it may be said that of the total diminution in Chinkiang's trade about 30 per cent. of it was due to the opening of the railway, this being accounted for by the fact that the railway has chiefly been used for native goods, imports such as sugar, matches, cotton yarn, and cotton piece goods being sent through Chinkiang as before.

The reason for this is that the junk people on their trips into the interior sell to the people through whose country they pass, acting as sale men for the importers in fact, and in addition to this the freight by railway on these classes of goods is very high.

Effect on Tsingtao

Owing to the facilities in the matter of duty, etc., it is very convenient for shippers of import and export cargo from the districts with Tsinan-fu as a centre to have their goods passed through Tsingtao, for there is but one likin station along the line of rail and that is situated at Kiaochao, whereas there are frequent likin stations in the valleys of the Canal, Huang Ho, Hsiaoching Ho and Yui Ho. Moreover necessity for transit passes in this rail borne cargo is done away with.

This very satisfactory state of affairs has materially assisted the development of the interior of the Province of Shantung and the progress that has been made especially in agricultural products since the opening of the line has been nothing short of marvellous.

Owing to the goods having to pay half duty and the existence of likin stations in the district of Tientsin, a great deal of the trade that used to be done in import and export cargo destined for the Tsinan sphere through Tientsin is now being diverted to Tsingtao.

The native products of Tsiningchou and Yenchou-fu were formerly collected and sent to the South through Tsinning the terminus of the South Canal but the fact that there is no likin as well as the convenience of the railway traffic from the interior of Shantung, will firmly establish the influence of Tsingtao in this section of Shantung. The same phenomenon will be noticed to the Northward of the Huang Ho. Also, in western Shantung, the part which was formerly served by Tientsin, the Chinese produce seller, who is very careful in his calculations, will reckon out the costs of transporting his goods by the old and the new ways and will of course adopt the cheapest method, and as there are ever increasing quantities or Lintsing cotton finding their way out by Tsingtao via Tsinan-fu, this is good evidence for assuming that the sending by Tsingtao by the railway will rapidly increase.

By the linking up of Tsingtao to the Tsinpu Railway system there has been already an expansion in trade in the following important centres, at part of Yenchou-fu, Taian-fu, Tungchang-fu, a part of Lintsingchou and the northern part of Hang Ho, and further expansion is surely expected.

Although the freight rates between Lukow and Hanchuang on the Southern frontier of Shantung are as high as those obtaining on the Southern section of the Tsinpu line, there is reason for this, there being no competition between the railway and river so that the produce from this part of the country will all find its way to the railway for carriage to Tsingtao via Tsinan-fu.

Effect on Tientsin

Seeing that the Yu Ho runs close along the line traversed by the Tsinpu railway from Tientsin to Sangyuang which is near to Techow on the borders on the Chihli Province, the rates of freight on this particular section of the line are the cheapest in the whole system, and between Techow and Huang Ho there are no very big trade centres, so traffic in that section is not so very large.

In the valley of the Yu Ho, Lintsing is the largest trade centre and it is connected with Tao Yu Chen in Honan, and the districts in the Yu Ho Valley which are most convenient for shippers of goods by rail lie between Tehchow and Tientsin, and the districts between Tientsin, Tehchow, and Lintsing, do not enjoy the advantages of the Railway traffic as in the districts between Chuchon, Linhuikuan and Nanking in the Southern section of the line.

The time taken by junk to transport goods between Lintsing and Tientsin is about one week in average circumstances, and in going from Tientsin to Lintsing there is about a 20 per cent. increase in the rate of freight in addition to which the journey takes from fifteen to twenty days according to the state of the river.

The Railway freight rate for second class goods between Tientsin and Sangyuang is 21 cents per picul, and the railway freight rate on second class goods between Tientsin and Tehchow is rather more then 24 cents per picul, so that comparison shows that goods which have to be brought from Lintsing to Tehchow by water and then transferred to the railway for shipment to Tientsin will cost a substantial deal more than waterborne cargo, hence shippers do not avail themselves of the Railway in these parts unless it is a case that the particular cargo is such that quick transport of the same is a necessity.

From the viewpoint of general commodities, Tientsin will not really suffer any appreciable commercial loss through the opening of the Tsinpu Line, nor will Tientsin receive any particular advantage, as also Tientsin need not fear that improved railway communication will cause Tsingtao to rob her of a fair share of interior trade, as the freight rates of the railway are so high in these parts compared with that of the water routes to Tientsin will be continued to be used extensively except for such special goods as it is necessary to be shipped rapidly to Tsingtao.

Tsingtao, it is admitted, stands in a much more favourable position than Tientsin, owing to the absence of Likin stations and the resulting payments of half duty but if the Government for the sake of finance, finds it necessary to institute Likin stations in Shantung then the Tsinpu railway will be more utilized for carrying goods to Tientsin. The Railway cannot hope to beat the water traffic, but, if the above described taxes are imposed, the railway will receive much more carrying to do from districts in which there is no water communication.

Future of Tsinpu Railway

The above remarks convey in a rough sort of way the conditions of the line at the present time.

Taking first the Southern section, the future of that is assured. Pengfou and Linhuaikuan are rapidly assuming much importance as trade centres owing to the water and rail communications meeting there, and around Hsuchow, as soon as normal conditions are restored, which do not exist at the present time for a variety of reasons, there will be tremendous trade increases in these districts.

As regards the Northern section, owing to the fact that Tsinan-fu is the direct junction of the Tsinpu and Tsingtao lines it will become more and more the actual trade centre of Shantung.

It is not so very long ago that Tsinan-fu was opened to international trade consequently there are as yet in Tsinan but few foreign firms that deal in native produce established, but of course that must now alter owing to the exceptional railway facilities and we prophecy that in the next few years there will be a very remarkable expansion of trade so that the outlook from that as regards the earnings in the future of the railway are very promising.

With reference to the Hsiao Ching River which runs between the city of Tsinan and the Gulf of Pechili at a place called, Yuan Chao Kao, the river is too shallow to be of much use at the present time; and it is 400 li in length. If however it were dredged, much use could be made of it and it would serve a number of places and would directly benefit the line. As it is this river is now only used for the conveyance of salt.

Revision or abolition of the present inland taxes would give much relief to water borne traffic in the districts north of the Huei Ho but there would be no corresponding benefits to the railway, still, whatever may be done in future, goods destined to be shipped across the seas to foreign countries will as time goes on more and more use the railway which has entered upon a career of, we trust, great prosperity.—*The China Tribune.*

SOUTH MANCHURIA RAILWAY

LOCOMOTIVES AND ROLLING STOCK

The latest returns for the locomotives and rolling stock of the S. M. Railway are as follow:—

Locomotives:

Inspection locomotives	2
Double ender tank engines	69
American type	4
Prairie Switcher type	35
Ten wheeler type tender	30
Pacific type tender	7
Consolidation type tender	108
	255

Cars and Wagons:

State car	1
1st cl. passenger cars	5
1st and 2nd cl. composite cars	24
1st cl. and Baggage composite cars	7
1st cl. and Dining " "	3
Dining cars	3
Sleeping cars	0
2nd cl. passenger cars	36
3rd " "	50
3rd cl. and Baggage composite cars	30
Mail and Baggage composite cars	22
Inspection car	1
Box cars	1,211
Gondola cars	1,099
Coal cars	165
Flat cars	123
Water tank cars	5
Oil tank cars	6
Caboose cars	106
	2,715

PRINCIPAL BRIDGES

On Main Line:

	Length.
Over Hsingyocheng River	1,352 ft.
" Taitzu "	1,467 "
" Hun "	2,606 "
" Tiehling "	1,014 "
" Ching "	2,262 "
" Tungliao "	1,014 "

On Mukden-Antung line:

Over Taitzu River	1,785 ft.

PRINCIPAL TUNNELS

	Length.
Fuchinling Tunnel	4,884 ft
Chikuanshan Tunnel	3,254 "

TRAFFIC RETURNS

The S.M.R. Traffic Returns for the month of October give Y. 1,259,743, being a decrease by Y. 14,360, as compared with the corresponding period of last year. The daily average amounted to Y. 40,637.

The aggregate receipts from last April totalled Y. 8,219,951 which means an increase of Y. 621,724 on the preceding year.

CAPITAL EXPENDITURE

The South Manchurian Railway Company management invested the total sum of Y.117,950,000 as capital expenditure up to March 1912. Originally, says the *Manchuria Daily News*, the sum of Y 100,000,000 was set aside for capital expenditure, but this was thought inadequate for the purpose, and the total was increased three years ago by Y.40,000,000, so as to meet the requirements of the first stage of the company's programme of sundry enterprises. The plans for the first stage were closed at the end of last March, and as the capital outlay for the second stage, a sum of Y.47,380,000 has been appropriated for disbursements during three years dating from the present fiscal year. This sum will be employed mostly in the construction and improvements of the railways, harbours, etc. The share allotted for the present year is Y. 15,920,000. This will be principally supplied by the Y.10,000,000 which was called up in two instalments of Y.6,000,000 and Y.4,000,000 on June 1st and Oct. 1st respectively. As regards the Y.31,460,000 for disbursement during the two succeeding fiscal years, the remainder of the subscribed share capital of the company, amounting to Y.8,000,000, will be called up first of all, and the balance of Y.23,460,000 is most likely to be raised by offering share stocks of the company for subscription, which is invested with the authority to increase its share capital up to Y 100,000,000 as occasion may require. It is said that no debentures for the purpose of raising the above-mentioned balance will be floated abroad.

KOWLOON-CANTON RAILWAY

At the meeting of the Hongkong Legislative Council held on October 26, the Colonial Secretary gave some interesting information relative to the Kowloon-Canton Railway. He stated that the total sum now estimated as being required to complete the construction and equipment of the Main and Branch Lines amounts to $2,128,052, or, excluding the sum of $1,473,880 already voted by Council for the Station site, to $654,172. The principal items of which this last figure is composed fall under five main heads of expenditure, namely, (*i*) Station and Station Yard, (*ii*) Locomotives, (*iii*) Addition to Engine and Engine Shops (*iv*) Carriage and Wagon Rolling Stock, and (*v*) Manager's House.

STATION AND STATION YARD

The provision required on this account is distributed under the following heads of charge:—

Formation	
(*c.*)—Roads	$ 6,655
Track	
(*a.*)—Ballast	10,954
(*b.*)—Permanent Way	31,075
Station and Buildings	
(*a.*)—Buildings and Fixtures	254,128
(*b.*)—Station Machinery	18,081
(*c.*)—Furniture	6,000
General Charges	
(*a.*)—(1.) Salaries and Allowances	12,477
(2.) Office Expenses	1,002
	$341,272

With the addition of one more main line engine there would be five engines of this description and three branch line engines, the order for the third branch line engine being now in the hands of the Crown Agents.

In regard to the terminal station at Kowloon the Colonial Secretary said that the plans for that building were not thrown open to public competition among local architects and others. He found that he could make more economical arrangements which he thought would be quite satisfactory. Mr. Hubback, of the Federated Malay States service, was to undertake the work, no matter what the cost might prove to be, whether $200,000 or $300,000, for an inclusive fee of $5,000, which, he thought was exclusive of travelling expenses to this Colony and hotel expenses. Mr. Hubback was a gentleman who had designed many terminal stations for large railways.

Great dissatisfaction is felt by the architects and civil engineers in Hongkong at the arrangement. It is pointed out that the recognised professional scale of remuneration for Architects services in the Federated Malay States is 7% on the cost of a building and in Hongkong for a building of this description would be 5% plus 1½% for quantities, so that assuming the Building to cost $200,000 the Government proposed to get for $5,000 what according to the recognized professional scale they should pay $13,000. The Royal Institute of British Architects of which body Mr. A. D. Bubback is a Fellow might have something to say in the matter, and it is suggested that it is more than probable that Mr. Hubback himself, will, when he learns of the invidious position in which he has been placed, decline to have anything further to do with what is described by one critic as a "Jew's Bargain."

SHANGHAI TRAMWAY RETURNS

The returns of the Shanghai Tramways (Foreign Settlement) for the week ended November 6 are as under:—

	1912.	1911.
Effective receipts (after deducting loss by exchange)	16,717.79	14,930.32
Passengers carried	859,313	700,896
Car miles run	52,702	50,790

The loss by exchange of subsidiary coinage for the week was equal to 23.57 per cent. of the gross cash collected on the cars as compared with 22.37 per cent. for the corresponding week last year.

For the week ended November 13:—

	1912.	1911.
Effective receipts (after deducting loss by exchange)	$15,457.98	$14,186.97
Passengers carried	784,669	680,229
Car miles run	51,127	50,008

The loss by exchange of subsidiary coinage for the week was equal to 23.39 per cent. of the gross cash collected on the cars as compared with 23.19 per cent. for the corresponding week last year.

For the week ended November 20:—

	1912.	1011.
Effective receipts (after deducting loss by exchange)	$16,174.51	$13,164.38
Passengers carried	823,813	629,571
Car miles run	53,544	48,395

The loss by exchange of subsidiary coinage for the week was equal to 23.29 per cent. of the gross cash collected on the cars as compared with 23.44 per cent. for the corresponding week last year.

The returns for ten months ended October 31 are as under:—

Effective receipts (after deducting loss by exchange)	$662,036,40	$514,299,49
Passengers carried	33,872,338	21,379,520
Car miles run	2,295,535	1,807,327

The loss by exchange of subsidiary coinage for the period was $201,940,61 equal to 24.86 per cent. of the gross cash collected on the cars, as compared with $134,110.79 equal to 22.72 per cent. for the corresponding period last year.

SHANGHAI-NANKING RAILWAY RETURNS

The following figures of traffic returns (approximately) for the week ended November 2, are issued by the Shanghai-Nanking Railway:—

Year.	Passengers.	Goods and Sundries earnings.	Total.
	$	$	$
1912	40,521	9,747	50,278
1911	67,700	7,829	75,538
Increase .	—	1,918	—
Decrease.	27,178	—	25,260

For forty-four Weeks.

Year.	Passengers.	Goods and Sundries	Total.
	$	$	$
1912	1,897,429	340,713	2,238,142
1911	1,532,652	258,815	1,791,467
Increase	364,777	81,898	446,675

For the week ended November 9:

Year.	Passengers.	Goods and Sundries earnings.	Total.
	$	$	$
1912	35,232	7,638	42,870
1911	61,607	7,086	68,693
Increase .	—	552	—
Decrease.	26,375	—	25,823

For forty-five Weeks.

Year.	Passengers.	Goods and Sundries	Total.
	$	$	$
1912	1,932,661	348,351	2,281,012
1911	1,594,259	265,901	1,860,160
Increase .	338,402	82,450	420,852
Decrease.	—	—	—

For the week ended November 16:

Year.	Passengers.	Goods and Sundries earnings.	Total.
	$	$	$
1912	43,042	10,108	53,150
1911	46,006	7,087	53,093
Increase .	—	3,021	57
Decrease.	2,964	—	—

For forty-six Weeks.

Year.	Passengers.	Goods and Sundries.	Total.
	$	$	$
1912	1,975,703	358,459	2,334,162
1911	1,640.265	272,988	1,913,253
Increase	335,438	85,461	420,009
Decrease.	—	—	—

A telegram, addressed by the Chinese Chambers of Commerce of Shanghai and Chinkiang to the Ministry of Communications at Peking, and republished in the Chinese Press, reads:—

As requested by the firms and merchants of Chinkiang interested in the business of transporting cargoes, who jointly submit that, owing to the inadequate provision of freight cars both on the Shanghai-Nanking and the Tientsin-Pukou Railways, much delay has been caused in the transport of cargo, which has a detrimental effect both upon commerce and upon the development of railway traffic. They assert that the Tientsin-Pukou Railway has consented to increase, somewhat, the accommodation for cargo, but the Shanghai-Nanking Railway has not yet vouchsafed any definite arrangement. They therefore earnestly pray that a telegraphic request be addressed to you for an order to be issued to all the stations to add more freight cars without delay, etc. We beg to ask your Ministry speedily to order the stations, etc.

ELECTRIC RAILWAY IN JAPAN

Mr. S. Furukawa, Director of the Central Office of the Japanese Imperial Government Railways, recently stated to a *Japan Advertiser* reporter that the scheme to put down an electric railway between Tokyo and Yokohama contemplates the substitution of electricity for steam not only from Tokyo to Yokohama, but from the latter point clear through to Kamakura, the present traffic being limited to the Tokaido, but that at the outset Yokohama would be the terminus of the electric road.

The new electric double-track from Gofukubashi, Tokyo, to Takashima-cho, Yokohama, will be reserved wholly for passenger traffic, and an entirely distinct steam line for goods is being built skirting the coast to the left of the electric route from Tokyo direction as far as Kamakura. The existing steam line will pass Kanagawa and thence proceed to Hiranuma and beyond, the line to Yokohama being abolished. For the new electric route the lines have already been laid from Shimbashi to Tsurumi.

The single overhead trolley system is being adopted, and the power-house is now under construction at Kawasaki. As far as is now known, each train will be made up of three bogie coaches, first, second, and third class, and will provide seating accommodation for more than two hundred persons.

An approximate estimate of the total cost of the new electric line, tracks, buildings, and rolling stock inclusive, is eleven million yen.

Korean Railways.—The Chosen Railway coaches which have been fitted with the Stone system of electric lighting were placed in service in October. The lighting is carried out by means of a dynamo and battery of accumulators suspended from the underframe of each coach. The equipments have been supplied by Messrs. J. Stone and Co. Ltd., Deptford, London. When the train is running, the dynamo supplies the current to the lamps and fans. When the train stops, the dynamo is automatically disconnected and the current is supplied by the battery.

In the sleeping cars, by means of an ingenious arrangement of switches, a bright light is obtained until the passenger wishes to retire, when he can either switch the lamps entirely or can turn them down so as to burn dimly during the night time.

The initial trials having proved successful, the Railway authorities have decided to equip the whole of the coaches, including third class, with electric light before the end to the present year.

Mr. Powell, the popular representative of Messrs. J. Stone & Co., is to be congratulated on the successful installation.

Szechuan-Hankow Railway.—General Li Yuan-hung, of Wuchang, has given an order to the effect that the accounts of the Szechuan-Hankow Railway be squared so that the work may begin soon. It is reported that Mr. Linow, the German Chief Engineer of the Tientsin-Pukow line, has been appointed by the Chinese Government as superintending Engineer for the German part of the Hankow-Szechuan line (Hankow-Ichang.)

At a conference held by General Li, Civil Governor Liu of Hupeh and the managers of railway affairs it was decided that the Szechuan-Hankow and Canton-Hankow Railways should be nationalized. It was arranged that all the material for the construction of the railway purchased by the private capitalists should be redeemed by the Government. The funds now reserved by the "people's Railway Company" may be invested in other commercial enterprises. The Company is authorized to construct the tributary lines in connection with the trunk railway.

The Peking Tramways.—The construction of the tramways in Peking, it was recently reported, had been placed in the hands of Mr. Chen Hsien-chu, who was said to have made full plans to raise a capital of $3,000,000. Mr. Chen was reported to have already obtained $1,000,000 which it was said would soon be remitted from Shanghai. As soon as the rules and regulations have been passed, the remaining $2,000,000 was to be raised in the provinces. It has been decided to have two main lines outside and inside the city, and also to have a number of important branch lines to Hsichihmen and other important point. Latest reports, however, state that there has been a hitch in the financial arrangements, and it is reported that the contract is likely, after all, to go to a German firm.

The Hukuang Line.—According to a telegram from Changsha, under date of November 18, work on the Hunan section on the trunk line from Canton to Hankow has been resumed. It was interrupted by the revolution and the later negotiations for a change of the original agreement to fit in with the new conditions. Mr. Collinson, the engineer-in-chief, and his party, are said to be at work on the northern end and on the Hupeh border, whilst at Chenchow, in the south of the province, Mr. Dees and his party are surveying.

Russian Endeavors.—News from Peking is to the effect that Russia has sent a demand to the Peking Government that the franchise for the construction of a railway between Moscow and Peking be given to Russians, but the Government has declined to grant this request.

A Harbin newspaper states that the Russo-Mongolian protocol provides for the construction of a railway from Kiakhta to Urga.

Some Russians have been granted by the Mongolian authorities at Hailar the desired franchise for the opening of a motor car service between Manchouli, Kulun, and Hailar.

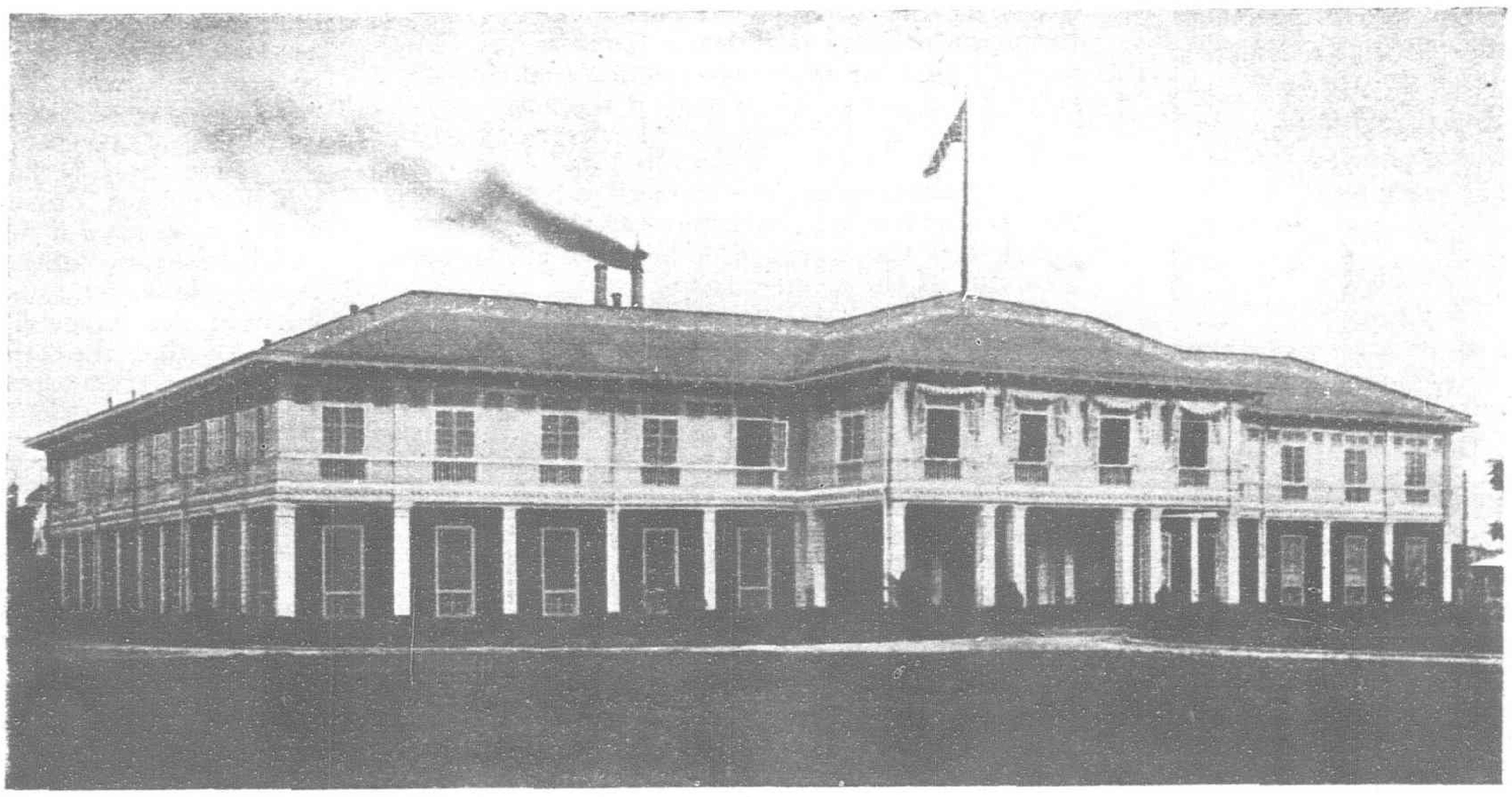
Penang Hill Line.—At a recent meeting of the Penang Legislative Council it was decided to vote $100,000 for the construction of a railway to the summit of the hill—a scheme for which the Governor hoped would be evolved before the end of the year.

Tientsin-Pukow Line.—The opening ceremony of the Tientsin-Pukow line is to take place on December 1. There will be a function at Pukow and Tientsin, the latter being the most important. The Yellow River Bridge (which was fully described in the October number of the FAR EASTERN REVIEW), was handed over to the Chinese authorities on November 16.

Light-rail Service at Kaiyuan.—The desired permission for the extension of the existing light-rail service at the Railway Town of Kaiyuan to the other parts of the town was given to the applicant, Mr. K. Kondo, Manager of the Sung Mow & Co., Tiehling, on Sept. 29. The work of extension will be commenced shortly.

Yellow River Bridge.—The last bolt of the Yellow River bridge on the Tientsin-Pukow Railway was riveted on November 16 in the presence of the Governor of Shantung and the chief engineers of the German and British sections of the railway, M. Borkowitz, engineer of the bridge, and large crowds of foreigners and Chinese. Regular through traffic will begin on December 1, when the Minister of Posts and Communications will open the line.

PHILIPPINE GOVERNMENT PRINTING OFFICE



BUREAU OF PRINTING, MANILA

Less than a decade ago, upon the recommendation of President Taft, then Civil Governor of the Philippines, and Brig. Gen. Clarence R. Edwards, chief of the Bureau of Insular Affairs, the War Department decided to establish a government printing office in the Philippines, and Mr. John S Leech, of Illinois, was selected as the public printer. He was instructed to prepare specifications for the equipment of a printing establishment of sufficient capacity to handle the work of the newly established government and to teach natives all branches of the printing trades. Few American printers are aware of the fact that, as a result of the manner in which these duties were fulfilled, there is in operation to-day on the borders of Asia—the "mysterious continent" that has ever frowned on progress—one of the most modern and complete printing plants in existence.

The Bureau of Printing was established in Manila in 1901. At that time the Filipino had no knowledge of the linotype, modern printing machinery, photo-engraving, electrotyping, or letterpress embossing. Only the crudest efforts at letterpress printing were in evidence before American occupation of the Philippines. During the three hundred years of Spanish rule practically no effort was made to improve the quality of the product and the intellectual capacity of the producer was equally backward. Among the more than twenty distinct dialectal divisions, composing a heterogeneous population of 8,000,000 people, technical knowledge of printing was confined to a few Spaniards and a sprinkling of Tagalos in the city of Manila.

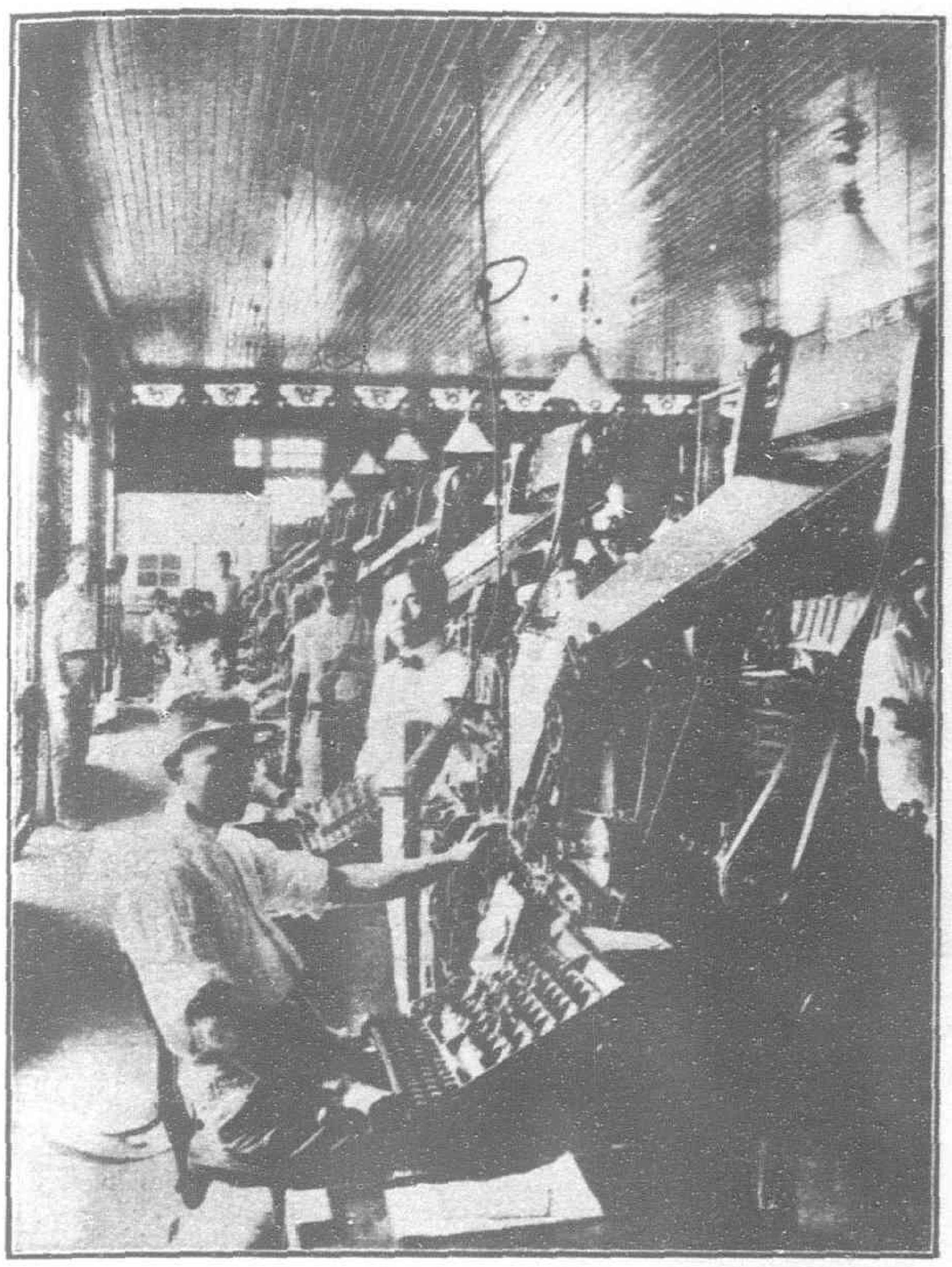
When the edict, "Teach the natives the printing trades," went forth, the magnitude of the undertaking seemed startling to those best acquainted with the conditions under which the instruction would necessarily be imparted. A consensus of opinion, if secured from those who were the first instructors, would have stifled the attempt. There was a Babel of languages—no common medium of communication—the dialects of the Philippines being as foreign to each other as Greek to Sanskrit. In some cases the inhabitants of adjoining towns where the same dialect is in use have difficulty in understanding each other because the people are so circumscribed in their local affairs and civilities. The apprentice from the Visayas could not converse with his Ilocano co-worker; the Pampango could not understand the Tagalo. Such was the condition existing among all of the representatives of the different peoples — Pangasinan, Bicol, Zambales, Cagayan, etc. But the projectors planned not for defeat. Their work was begun in the spirit of faith and continued in hope; the ground had to be tilled and made ready for the intellectual sowing. The expected difficulties were met and overcome by diligence, patience and concentration of purpose. Apprentices were required to attend English night schools, their technical instruction in the bureau was of an order that appealed to the intellect to grasp and not to the eye to copy, with the result that at this time every mechanical operation in the Bureau of Printing is performed by native Filipinos under the supervision of American craftsmen instructors. All of the Christian peoples and the remotest provinces of the islands are represented in the bureau. English is the language substituted for the many dialects and the native is acquiring an education as well as a useful trade. Eight trades are taught, and there are eighty or more apprentices under instruction in the various divisions at all times.

The Bureau of Printing apprenticeship school is a model for a manufacturing institution. The apprentices are classified in order that no injustice may be done the apt and enthusiastic, the advantages being two-fold—giving a mark of distinction to the efficient and increasing the efforts of the backward. It may surprise those who are familiar with the Malay character to learn that this does not result in self-elation in the one or in the humiliation of the other.

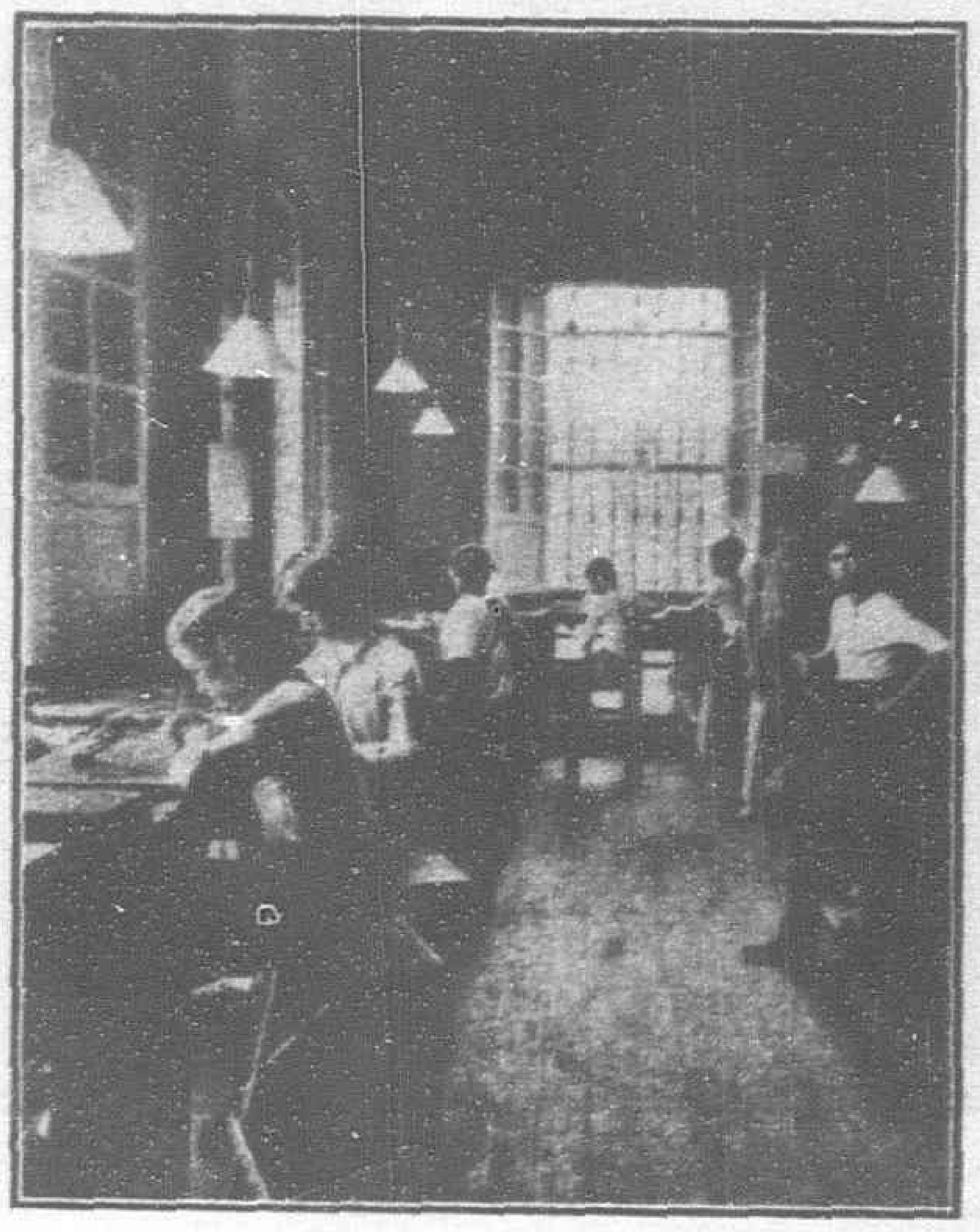
Efficiency records are kept and discipline is maintained by a system of commendatory and adverse reports, which result in letters of appreciation for meritorious work and written reprimands in cases of carelessness, insubordination or infractions of office rules.

Director Leech's method of instruction, owing to the peculiar conditions existing in his field of work, is necessarily a departure from the modern tendency to make every man a specialist and confine him to operations of one class. His system comprehends thorough instruction in each operation of the several branches of the printing trades. The apprentice is not forced to acquire mechanical skill by chance contact with the daily routine of the journeyman, but is under the constant supervision of efficient American instructors. The training of young men in the Bureau of Printing is systematic, being co-ordinate with that of the public school system and, as an

MR. JOHN S. LEECH



COMPOSING ROOM—LINOTYPE SECTION



ELECTROTYPE AND STEREOTYPE DIVISION—FINISHING SECTION

PHOTO-ENGRAVING DIVISION—CAMERA SECTION

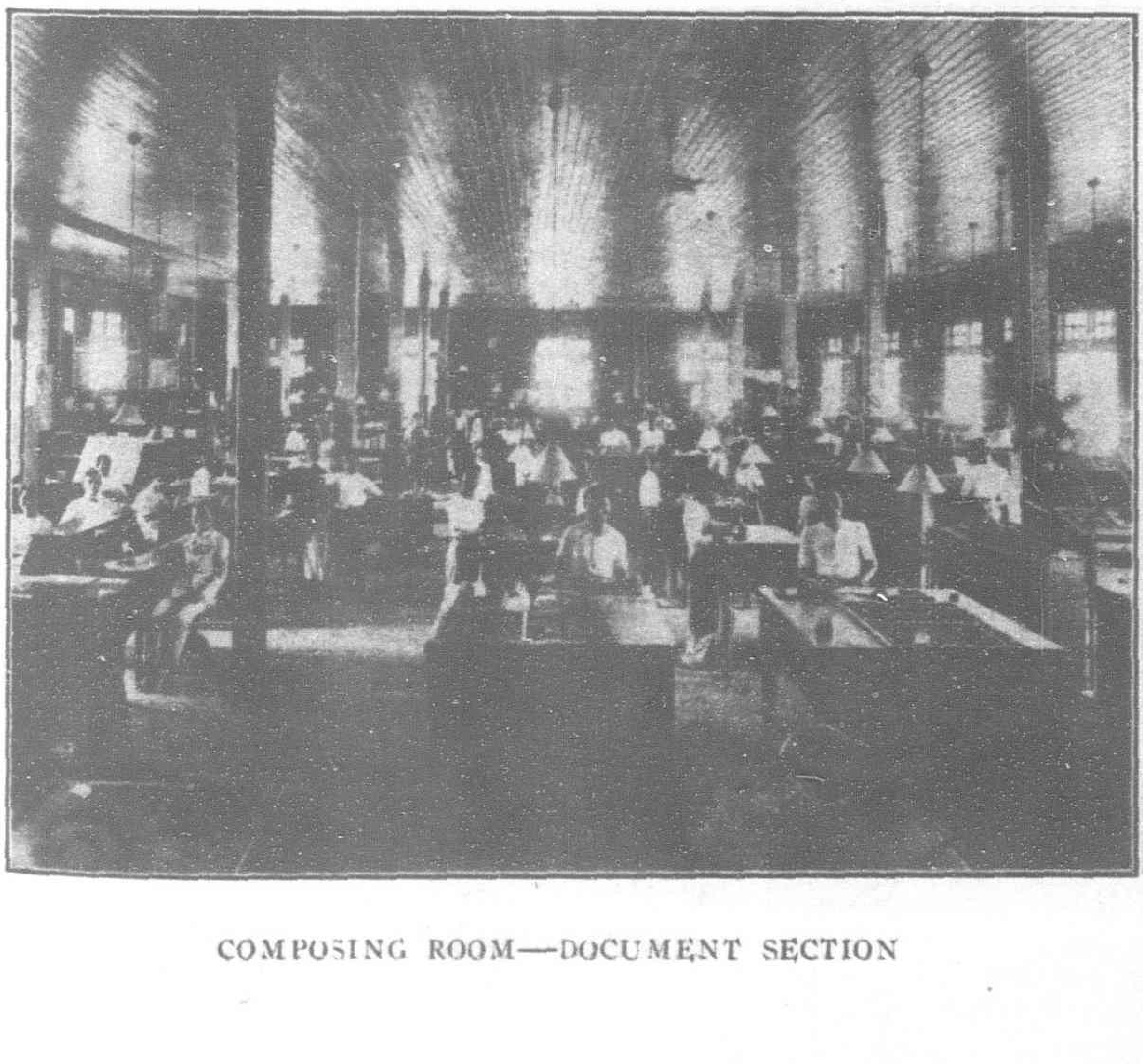
industrial school, is among the few that turn out finished journeymen.

The apprentice is assigned to a branch of the printing trade according to his adaptability for the work, careful consideration being given to his physical and mental qualifications. There are six class periods of six months each, and if he qualifies in all the apprentice is promoted to junior craftsman at the end of three years. The work of a junior craftsman covers a period of one year and includes advanced specialties and a review of the work of his apprenticeship. Therefore, if he has shown proficiency in all of his work, the employee is graduated as a craftsman at the close of his fourth year.

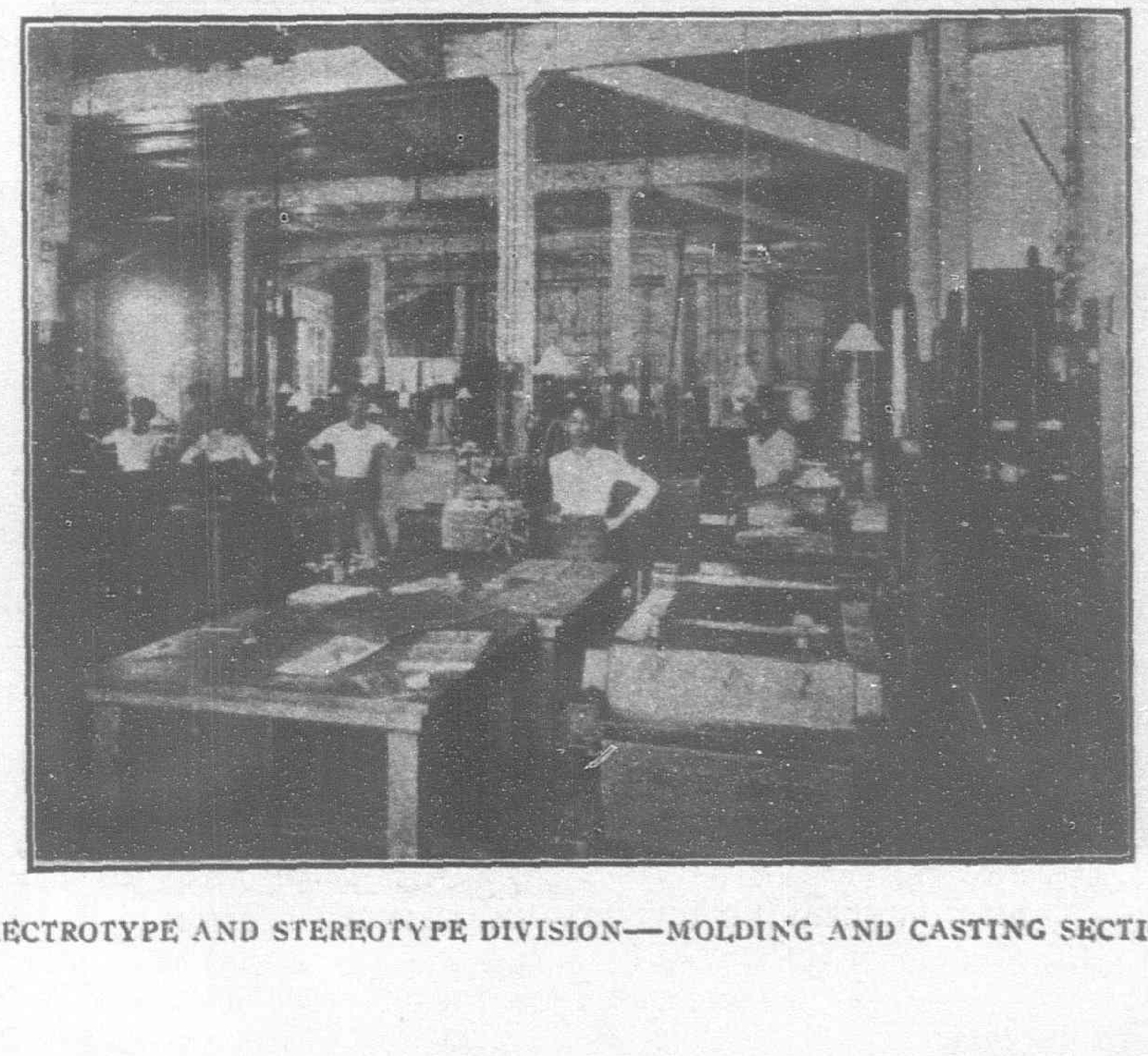
The simplest work is taught first. An apprentice who demonstrates inaptitude for mechanical details during the first-class period of six months is advised to seek other fields of labor. Justice to the employee as well as to the service demands frankness in a matter that influences the formative period of a boy's life. Should the apprentice prove to be dull and his progress not in keeping with the character of the work, he is retained in the current class period a sufficient length of time to complete the necessary specialties. Apprentices are rated every six months and none is promoted until proficiency is shown in all work. This thorough instruction finally results in a craftsman who is competent to perform any task assigned to him—one who is a credit to his trade.

The Bureau of Printing is situated along the Paseo de Bagumbayan, adjoining the botanical gardens. The grounds are adorned with cocoanut palms, shell walks and winding drives. The interior of the building, with its hand-carved stairways of red hardwood, its polished floors and its modern office paraphernalia, is a model of neatness and cleanliness. The mechanical divisions are logically arranged in the most advantageous manner for the progress of the work. Every year hundreds of people visit the plant and are surprised at the scope of its work and the dispatch with which it is accomplished. This is particularly true of the round-the-world tourist, who, ere he reaches Manila, has become imbued with the belief that it were idle to attempt to "hustle the East."

A day's work in the Bureau consists of seven hours, with a half holiday on Saturday. The American instructors receive twenty-eight days' vacation leave annually. In addition they receive thirty-five days' leave annually which may accrue for a period of five years. Employees are required to work at least two years to obtain the benefits of accrued leave and reimbursement for traveling expenses incurred in coming to Manila. The privilege of taking accrued leave for the purpose of visiting the United States or foreign countries, with reimbursement for return traveling expenses, is granted every three years. No leave is granted the native workmen, but in lieu thereof they receive an annual bonus, the amount of which is governed by their attendance and the nature of their services. The bonus is the director's solution of the difficulty that confronts nearly every employer

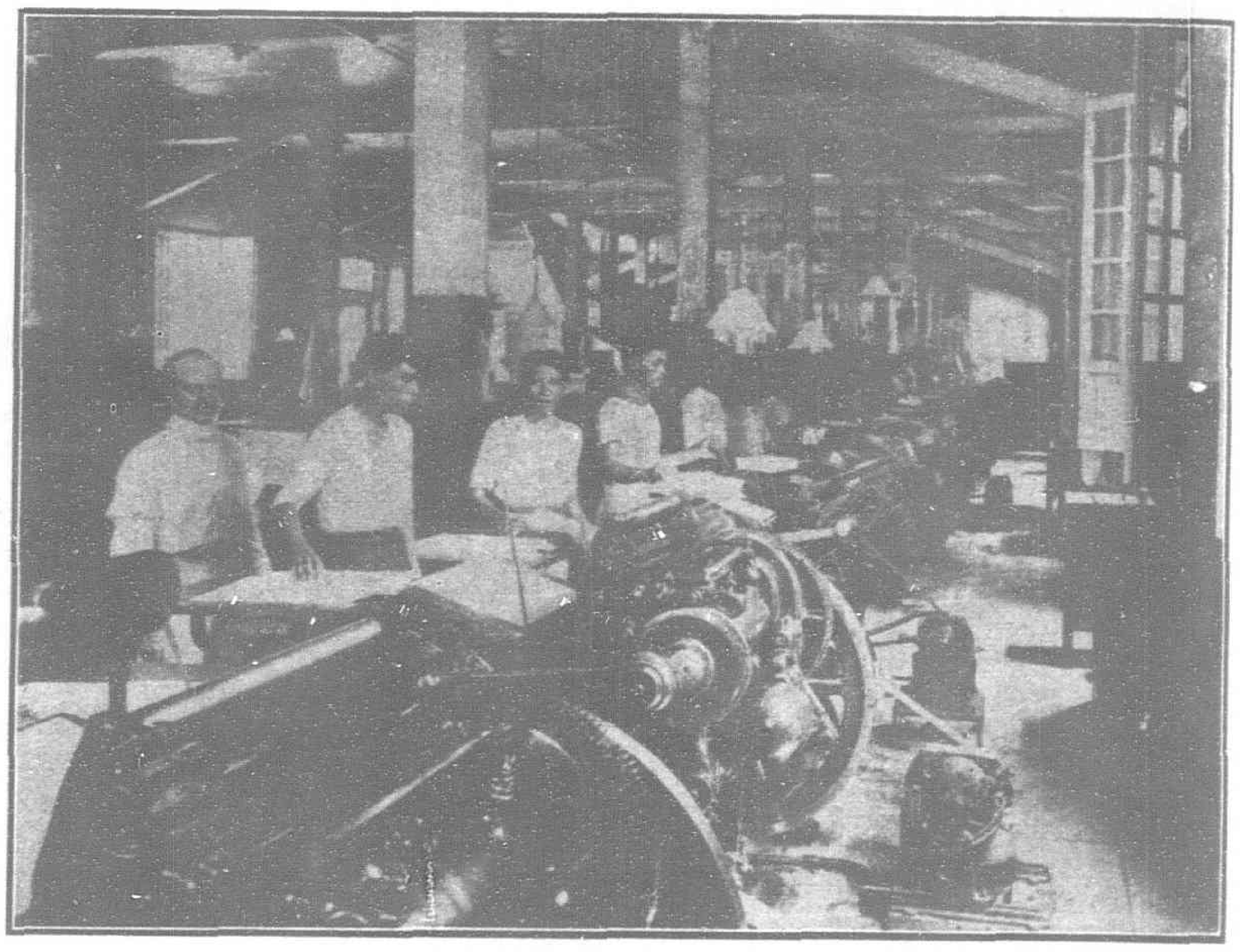


COMPOSING ROOM—DOCUMENT SECTION

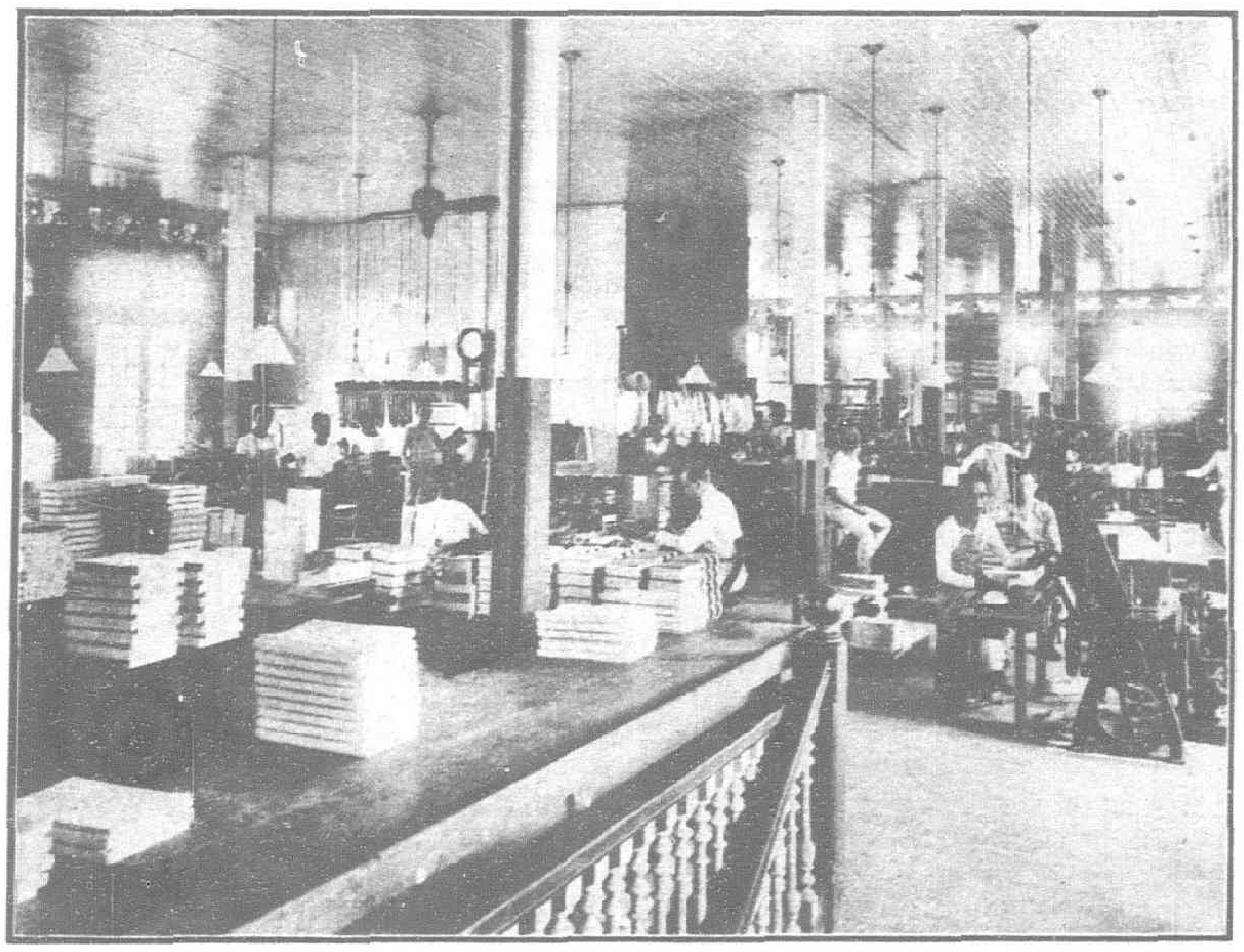


ELECTROTYPE AND STEREOTYPE DIVISION—MOLDING AND CASTING SECTION

PRESS ROOM—CYLINDER PRESS SECTION



PRESS ROOM—PLATEN PRESS SECTION



BINDERY DIVISION—FINISHING, SEWING AND NUMBERING SECTION

BINDERY DIVISION—RULING SECTION

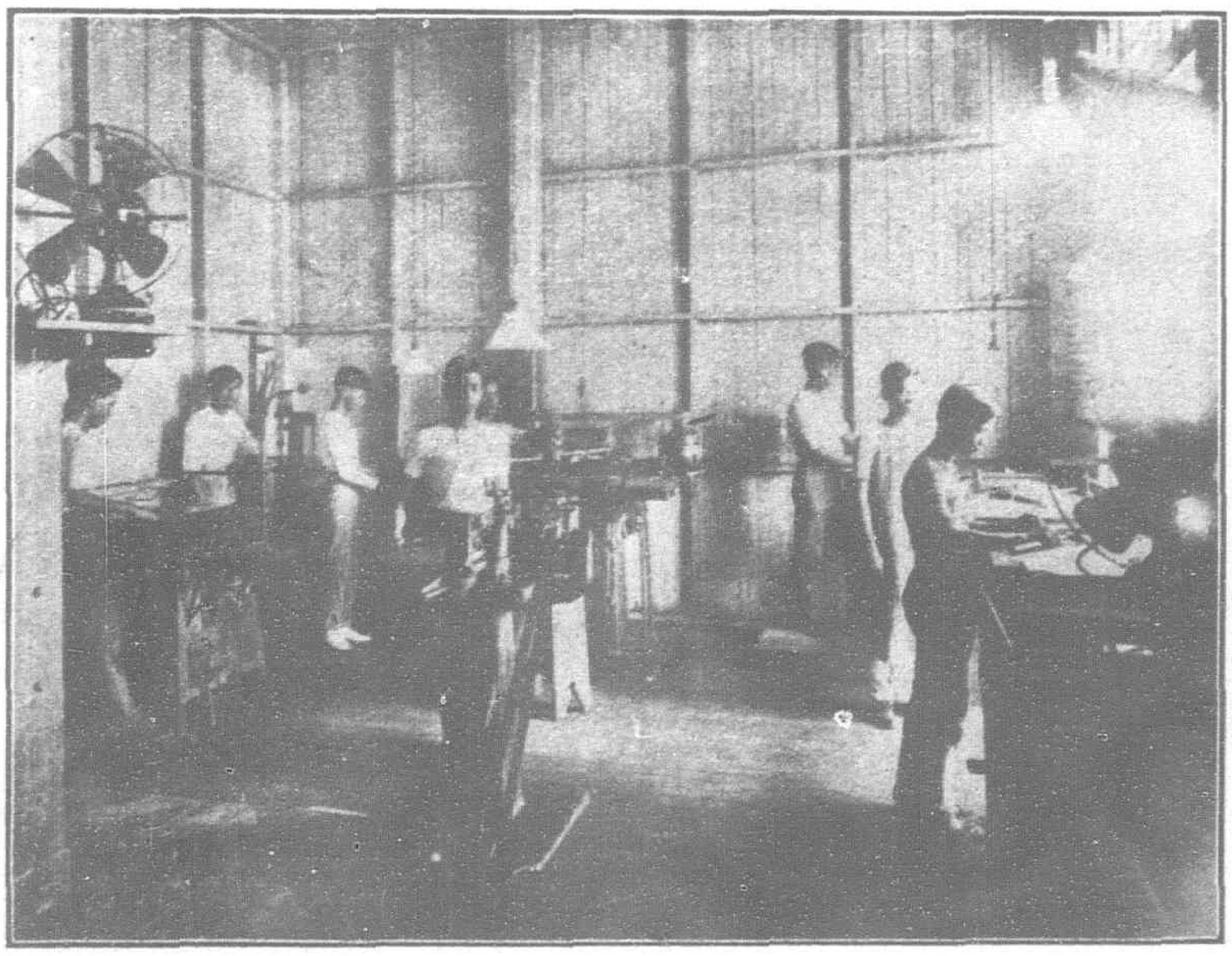
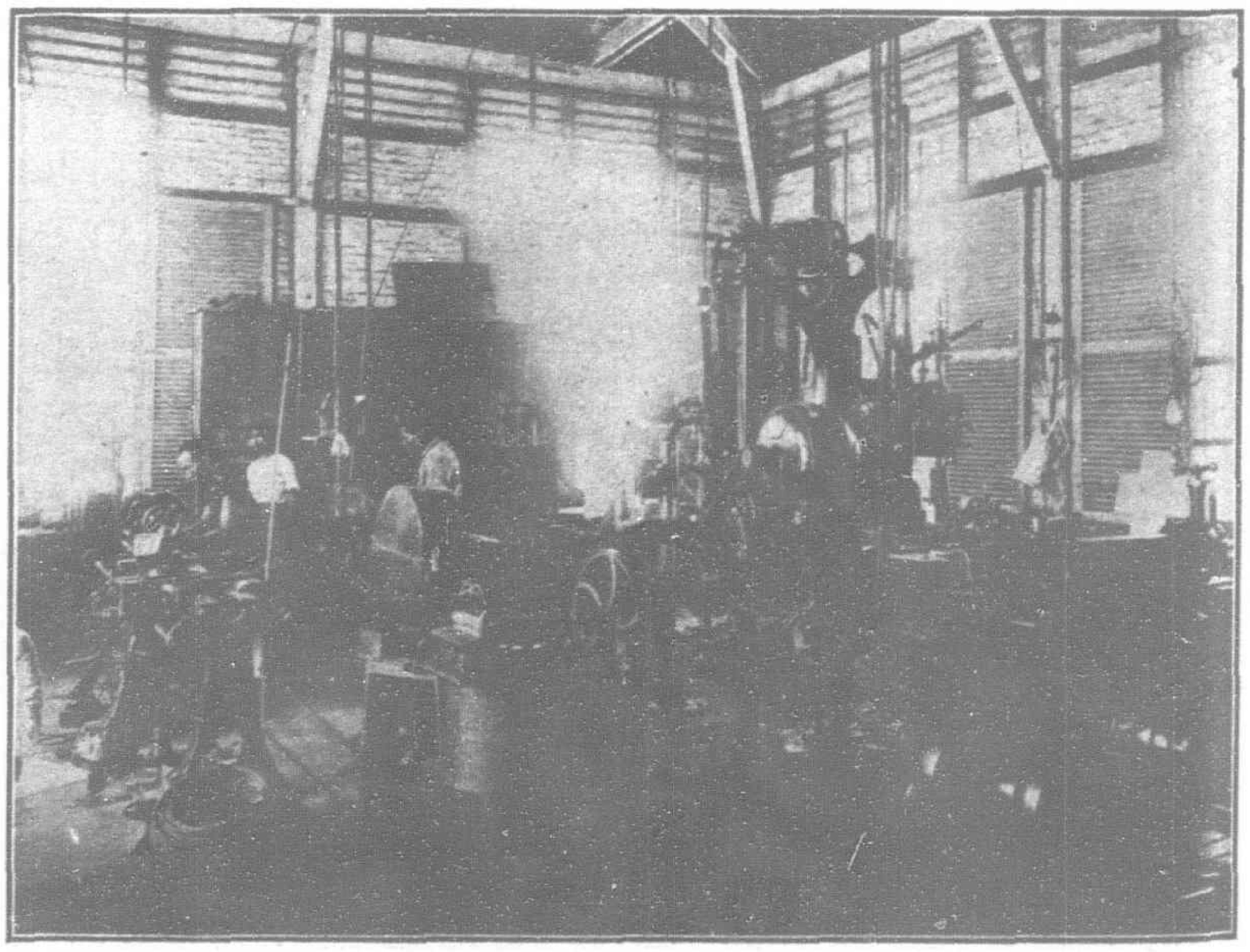


PHOTO-ENGRAVING DIVISION—MACHINERY SECTION



MACHINE SHOP

of Orient labor—that of inducing workmen to report for duty before being impelled by necessity—and it has been successfully adopted by large corporations in the Philippines.

Besides producing printing and binding for the forty-two provinces, 785 municipalities and sixty-four bureaux and offices of the Philippine government, the Bureau of Printing supplies such demands as are made upon it by the military government, the United States naval station, and the Philippine Legislature. It also prints two weekly official gazettes in English and Spanish, four bi-monthly scientific journals, a monthly weather bulletin in English and Spanish, and numerous miscellaneous publications. Sixteen thousand work orders were completed during the past fiscal year. The Bureau maintains its own transportation and delivery systems, handling an average annual output of approximately 175,000 packages.

Bureaux of the Philippine government are not permitted to enter into competition with private firms or individuals, but may do such work as is requested by parties who are unable to secure their needs in the local market. In this way considerable printing of the better class is handled every year by the Bureau of Printing. This is particularly true of the photo-engraving division, which furnishes illustrations not only for the Philippines but also for cities of China.

The accounting system of the Bureau of Printing has been commended by expert accountants whose services have at times been utilized by the Philippine government. The most important problem confronting the progressive printer and publisher of to-day is that of devising a cost system which will accurately show the cost of the manufacture of his product. The Bureau of Printing has had in operation for several years a cost system which embodies all of the good features of those so far discussed or adopted by cost commissions and is superior by reason of its simplicity in compiling data.

The Bureau of Printing purchasing system provides at all times an adequate quantity of stock. As all materials entering into the product of the plant are imported, and as from five months to one year are required for delivery, necessity has evolved a system which provides against all contingencies through a series of alarms, which show when the supply has reached the point which will admit of the receipt of a new order before the amount on hand shall have been expended. With such modifications as were required to meet local conditions, this system has been universally adopted by the Philippine government. The utility of the accounting system in general has been demonstrated through its application to the Government Printing Office at Washington, where it has been favorably commented upon by the Public Printer in his annual report for the past two fiscal years.

The work of the Bureau of Printing is of such high character that it is conceded to be the leading exponent of letterpress printing in the Far East. It has set a high standard for commercial printers and aids in its maintenance by honoring every requisition for thoroughly trained workmen that may be made by local publishers. The plant is valued at $500,000 in United States currency. It is provided with facilities for the production of every operation known to letterpress printing. The composing division is equipped with fourteen modern single and double-magazine Mergenthaler linotypes, Miller linotype saw and trimmer, Wesel steel imposing stones, iron case racks and stands, Porter cabinets, Universal brass rule saw, Golding rule and slug cutters, and Washington hand, Wesel self-inking and Hoe flatbed signature proof presses; tables and all sorts of cabinets are of narra hardwood.

The photo-engraving division is equipped with an Anthony & Scovill enlarging, reducing and copying camera and a Levy process camera, with color filters for three and four-color process work; Levy half-tone screens, from 65 to 400-line; Macbeth ultra-violet inclosed and Colt open arc lamps; Wesel fountain air brush and pump, Washington hand press, Royle radial arm router and beveling and lining machines; Ostrander-Seymour trimmer and Royle cabinet and jig saws, column drill, and negative squaring machine; Royal and Wesel oval and circle cutters and Ideal printing frames.

The stereotyping and electrotyping division is equipped with black-leading, hand and power curving, rotary planing, planing and roughing, revising and plate-mortising, Royle routing, sawing and trimming, hand and power shaving, Hoe shaving, beveling and squaring, wax shaving, and Wesel lead and slug shaving machines; ingot, lead and slug, and metal furniture molds; hand proof, hand electrotype molding, hydraulic cylinder pump, Lovejoy hydraulic electrotype and hydraulic pressure-gauge presses; Royle, cabinet and combination jig and drilling machine saws, and steam drying table.

The press division is equipped with Miehle cylinder, Harris automatic, Colt's Armory, Universal, Chandler & Price Gordon presses and Carver & Swift embossing presses, automatic feeding attachments, a complete roller-making outfit, consisting of a steam-jacket reducing kettle, pressure kettle, air pump and roller extractor, and an 18-inch 3-roller ink mill.

The bindery division is equipped with Dexter folders and feeders, Latham stitching and sewing machines, Smyth book-sewing machines, Singer sewing machines, Seybold book compressor, Brown & Carver and White cutters, Peerless and Latham perforators, Seybold rotary board cutters, round-cornering and index cutters, Hickok ruling machines, Sheridan stamping machine, and the latest models of back-molding, paging, numbering, roller-backing, punching, rounding, paring and trimming machines.

The machine shop is equipped with a 20-inch shaper, lathes, large and small drill presses, grindstones, emery wheels and surface, drill and knife grinders.

Each machine in the plant is operated by its own individual electric motor, either direct or gear connected. Electric current is supplied by the power plant, which is provided with two 100-horsepower Economic fire-tube boilers, driving two 75-horsepower Ideal engines, direct connected to two 50-kilowatt Crocker-Wheeler direct current, 110-volt generators. All apparatus is in duplicate, rendering a shutdown almost impossible. A switchboard of blue Vermont marble, containing recording volt, ampere and watt meters, was designed and constructed by employees. There are eleven feeder circuits for power and lighting, each protected by an individual circuit breaker.

To summarize, the Philippine Bureau of Printing is a large producing establishment as well as a trade school. Its product is manufactured more economically than work of a similar kind in the United States, although all materials consumed are imported from a base of supply located 15,000 miles from Manila, and it pays the liberal gratuities allowed all government employees. It has aroused the native to active interest in healthful outdoor athletics by making the baseball field more attractive than the cock pit. It is fostering thrift in the greatest gamblers under the sun by influencing them to become regular depositors in the postal savings banks. It has received the gratitude of leaders of the Philippine people for its efforts in training boys to become useful citizens, and, in general, it is an institution which is a credit to the American government as well as a monument to the executive genius of its organizer and director, Mr. John S. Leech.

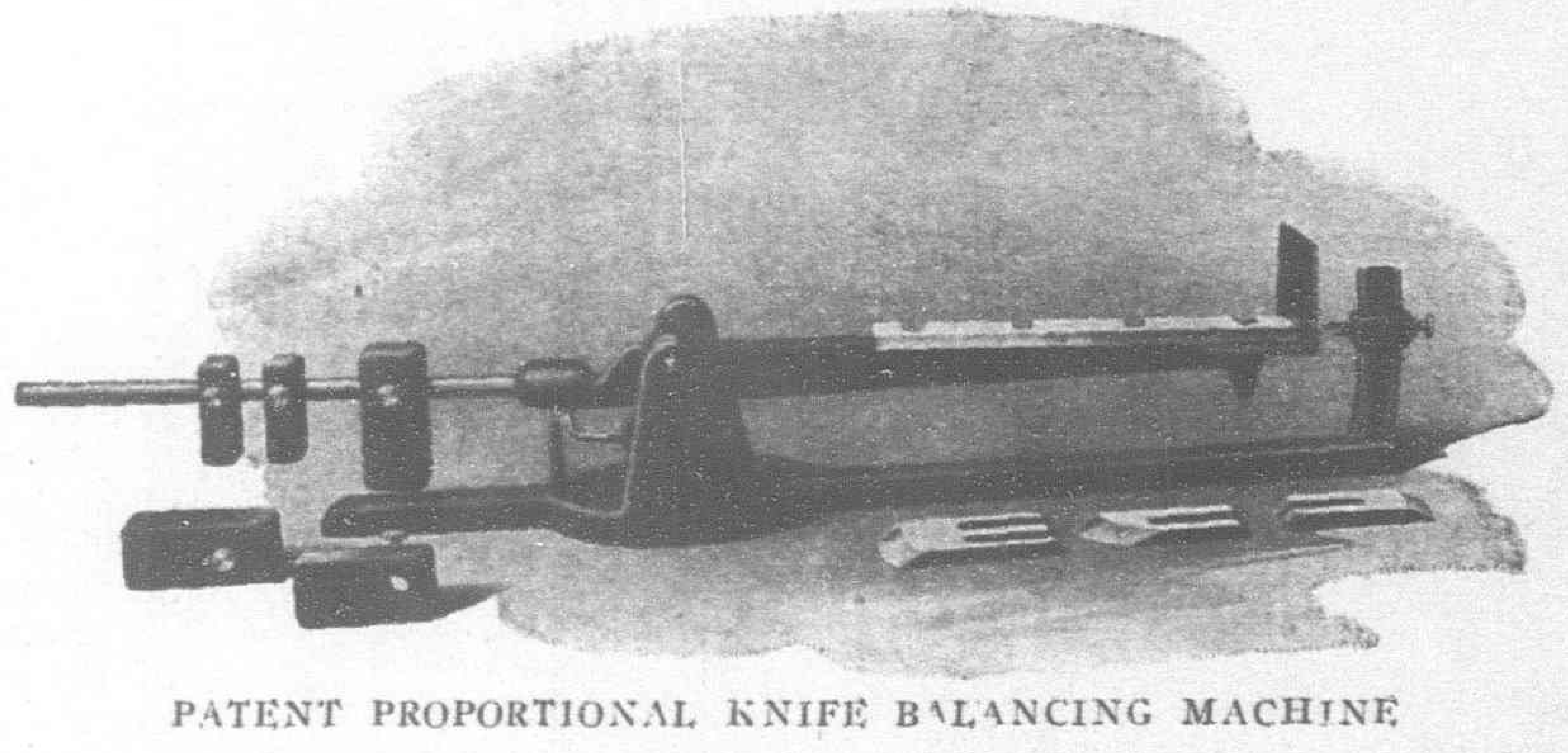
THE NEW "DEFIANCE" KNIFE BALANCING MACHINE

What is said to be the only machine capable of securing an absolutely perfect balance to all classes of knives of every size and shape, revolving cutters, knife-screws, etc., is herewith illustrated and described as the "Defiance" Patent Proportional Knife Balancing Machine.

This machine is too well known to the users of machine knives to require a lengthy description.

Knives could be reduced to the same specific weight by the aid of a common grocers' scales, but that would not attain the object; by the use of the Proportional Balancing Machine the position, as well as the amount of excess of weight, can be ascertained, so that in reducing the knives to the same specific weight they may be made to agree in their corresponding parts. The method hitherto used is by reducing pairs or sets of knives to the same dimensions, and by aid of common scales to the same specific weight; but so great are the differences in the density of the parts of even the same knife, that a still running set of knives is but an accidental result.

In operating, let it be supposed that two or more knives are intended to be fastened into one cutterhead, rotating at a high velocity, and that it be conceded that they must not only be of the same specific weight, but must agree in their corresponding parts. Place each knife in succession on the platform of the Balancing Machine, with its face toward the end-board: with a suitable weight, at the opposite end of the beam; if by this test they all appear to be of the same specific weight, place them each in succession again, with their backs against the end-board; they may still appear to be of the same specific weight; place them each in succession flatwise on the platform, in as many different positions of which they are susceptible, noting and reducing by an indefinite number of trials the edges which are found to be of excessive weight, until they all are reduced to the same weight in their corresponding parts. They will also then, of course, be of the same specific weight. The balance weights are made oblong, so that by putting the heavy end up, the entire mass, consisting of weight, beam and knife, may be poised near its center of gravity, and thereby oscillate more sensitively. If, however, the object to be balanced be very heavy, the weight must hang down, or the upper portion of the mass may preponderate. It will be seen that the operator can make the poise more or less delicate, according to the varied positions of the knives to be balanced.



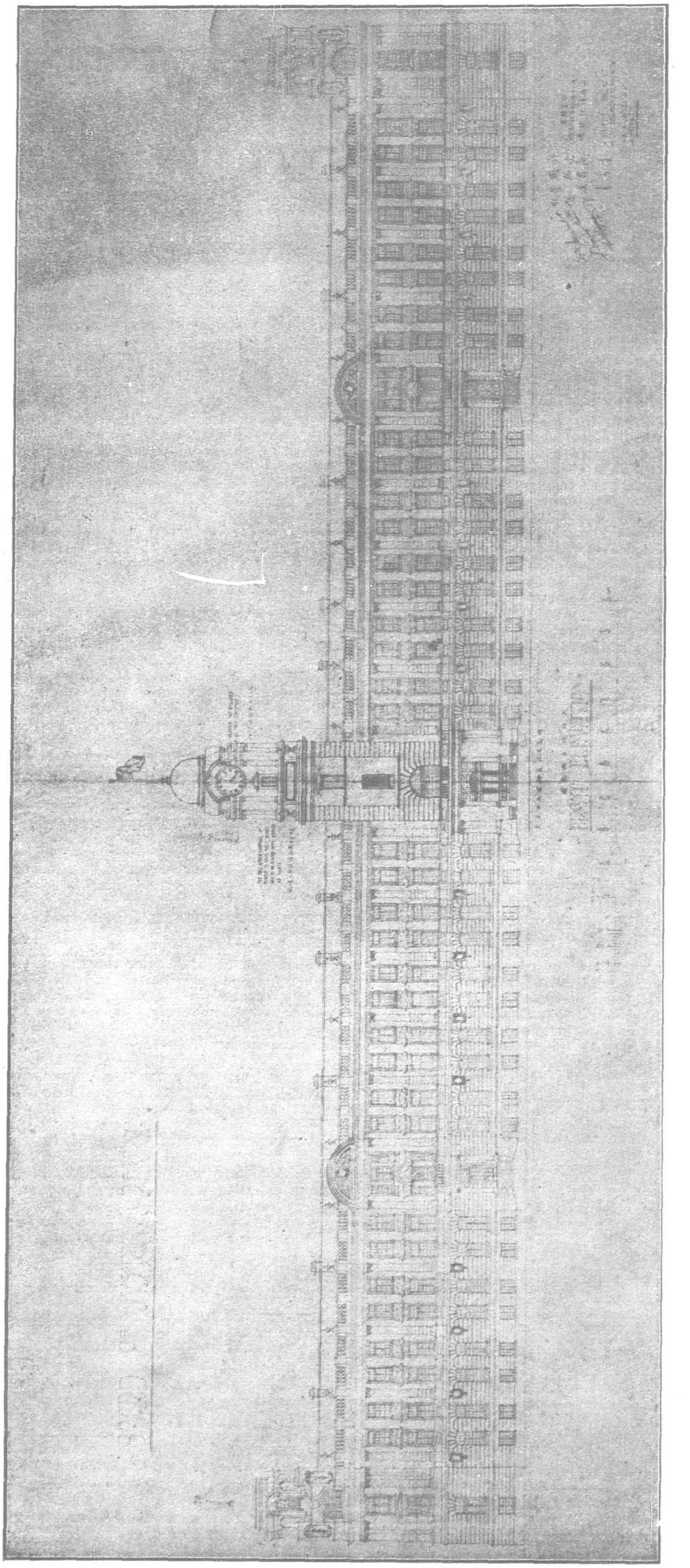
PATENT PROPORTIONAL KNIFE BALANCING MACHINE

A more efficient and serviceable tool was never built. Every knife, whether large or small, is guaranteed to be perfectly balanced after leaving this machine and the work produced by them is always uniform and free from defects.

Further information and price relative to this valuable little machine will be gladly furnished by the manufacturers, the Defiance Machine Works, Defiance, Ohio, U.S.A.

MINING

Lepanto Development Co.—The Lepanto Development Company with a capital of P.15,000 has been registered at the Bureau of Archives and will undertake the development of mineral lands in the Philippine Islands. The incorporators are Charles P. Fisher, Harriet Fisher, A. O. Olson, Walter C. Holmes and Jeremiah Ortegas. The capital stock is divided into 150 shares of P.100 each, and of the amount, P.3,000 has been subscribed and P.1,000 paid up.



BOARD OF JUSTICE, PEKING (NOW NEARING COMPLETION)

SUPREME COURT OF JUSTICE

PEKING

What will form an important addition to the few existing government buildings in Peking designed in foreign style, is that presently being erected for the Supreme Court of Justice there. Situated in the Hsin Pu Chi Street in the Western Quarter of the Tartar City, the building is of some considerable extent, having a frontage to Hsin Pu Chi Street of 450 feet, and a depth of approximately 150 feet, and being four storeys in height, it stands out prominently from the immediate surroundings.

The building is designed in a free treatment of the English Renaissance style of architecture, and being set back close on 150 feet from the roadway, it has a decidedly handsome and attractive appearance.

The façade to the street has a rusticated ground floor storey, and two floors above marked by an Ionic colonnade, the whole being crowned by a balustraded parapet. The central feature of the façade is the clock tower, which rises to a height of 110 feet, while at either end of the front there are smaller towers rising to a height of 90 feet. Each of these towers has a dome top, which is covered with copper. The building throughout is built of local made brick, the whole frontage, and the return faces of the corner towers being finished off in cement plaster, while the remainder of the elevations is faced with blue bricks having bands of red brickwork at the sill and lintel courses as well as in the pilasters. The roofs are covered with red tiles also of local make. In the centre of the building are two large courtyards, each measuring 155 feet by 55 feet, thus ensuring plenty of light and ventilation throughout all the rooms in the building.

Access will be obtained from the roadway through two handsome wrought iron gateways, set back some distance from the front boundary, and on either side of the forecourts to same, there will be erected two small gate lodges.

The principal entrance to the building is in the centre of the façade under the clock tower, while there are also other entrances in the front elevation to the right and left of the main entrance, as well as on the side and back elevations, all of which give easy and immediate access to any part of the building. Entering under the clock tower and passing through a vestibule and outer hall, the main entrance opens out into a fine staircase hall, out of which rise the two principal staircases giving access to the upper floors.

The accommodation on the ground floor, on the South side, of the building, comprises two large criminal courts, each having in suite judges rooms, consulting rooms, retiring rooms, and numerous rooms for witnesses and servants. On the North side are two large civil courts with accommodation similar to that for the criminal courts. In addition there is accommodation provided for the law library, secretaries' offices, retiring rooms, enquiry offices, despatch rooms, attorneys' rooms, reporters' rooms, reception rooms, telephone rooms and servants' rooms, while there is ample lavatory accommodation.

On the first floor the principal apartment is the Supreme Court, adjacent to which are suites of rooms for the Chief Justice, the Attorney General, the Judges, the Chief of the Court, and their respective secretaries. On this floor also, there is a large civil court, a general meeting hall and reception room, rooms for the secretaries, a large reading room, and numerous retiring rooms, as well as rooms for witnesses and servants, and ample lavatory accommodation.

On the second floor, there are fifteen suites of three large rooms each, forming offices for the various branches of the courts' work.

In the basement, accommodation will be provided for the heating plant, electrical plant, kitchens, servants, etc., and in addition there is large storage space. In the upper part of the central tower there will be provision made for a clock, with 8 feet diameter dials facing all four ways, and a large bell, both of which should be of great service to the inhabitants of the Western quarter of Peking.

The whole of the sanitary fittings, and the plumbing and drainage work will be carried out in accordance with the latest improvements in sanitary science, the septic tank system being installed for the treatment of the sewage.

The buildings throughout will be heated by steam on the low pressure gravity system, with radiators in the principal rooms and corridors, while an electric light and electric bell installation, and a telephone system are also being installed.

Messrs. A. H. Jaques and Co., Builders and Contractors, of Tientsin and Peking, are the general contractors for the whole of the works on the building, which has been designed and erected under the superintendence of Messrs. Atkinson and Dallas, Ld., Civil Engineers and Architects, 4 Legation Street, Peking.

UNION INSURANCE SOCIETY'S BUILDING, SHANGHAI

The Union Insurance Society of Canton, Limited, which stands foremost among Far Eastern Marine Insurance Companies, demonstrates its enterprise by contracting for the erection of a striking and substantial set of offices on the Bund, Shanghai. The site selected is that hitherto occupied by the offices of Messrs. Dodwell and Co., Limited, adjoining the new Shanghai Club, (illustrated in the July issue of the FAR EASTERN REVIEW) and being at the junction of the Bund and Canton Road gives ample room for the erection of a spacious pile—one calculated to emulate in appearance the handsome Shanghai Club, and enhance the architectural features of the Settlement. The Union Insurance Society went for its designs to a firm long accustomed to Eastern needs and modern development and the result is a handsome plan and specifications for a building which will be the pioneer of its kind in Shanghai.

With a frontage of 100 feet to the Bund and 240 feet to Canton Road, the pile will rise six storeys, and will be of modern renaissance design. On the Canton Road corner a square tower and cupola will be a distinguishing feature. The construction will be of steel skeleton frame, brick and reinforced concrete. The floors will be of concrete, finished with flooring or tiles and the building will thus be fireproof.

The ground floor has been designed to afford up-to-date accommodation for banking and shipping office work. The Union Insurance Company will have its office on the first floor, and two other floors will also be devoted to modern offices. The fourth and fifth floors will be utilised for residential flats, and these will be carried out in the sumptuous style demanded by present-day advancement in the art of living. The roof will be flat, and may be used as a roof garden.

The site is now being prepared, and work upon the foundations will be commenced as soon as possible. The designs are from the offices of the well-known firm of Hongkong architects, Messrs. Palmer and Turner, who have now opened an office in the Telephone Exchange Buildings, Shanghai.

ENGINEERING SOCIETY OF SHANGHAI

At the Annual General Meeting of the Shanghai Society of Engineers and Architects held on November 26 it was decided unanimously to alter the name of the Society to "The Engineering Society of Shanghai." The President, Vice-Presidents and Council were elected for the ensuing year, as follow:

President.—Mr. E. J. Dunstan. M. I., Mech. E.

Vice-Presidents.—Mr. D. O. Dick, and Mr. A. C. Clear.

Members of Council.—Messrs. A. E. Algar, P. H. Cole, J. S. S. Cooper, H. von Heidenstan, P. Peebles, S. J. Powell, F. O. Reynolds, W. F. Tyler, and Mr. W. Wantz.

Hon. Secretary.—Mr. W. J. Williams.

The Society has had a very successful year and during the session most interesting papers have been read.

A hearty vote of thanks was accorded to the retiring President (Mr. T. H. U. Aldridge) and Council.

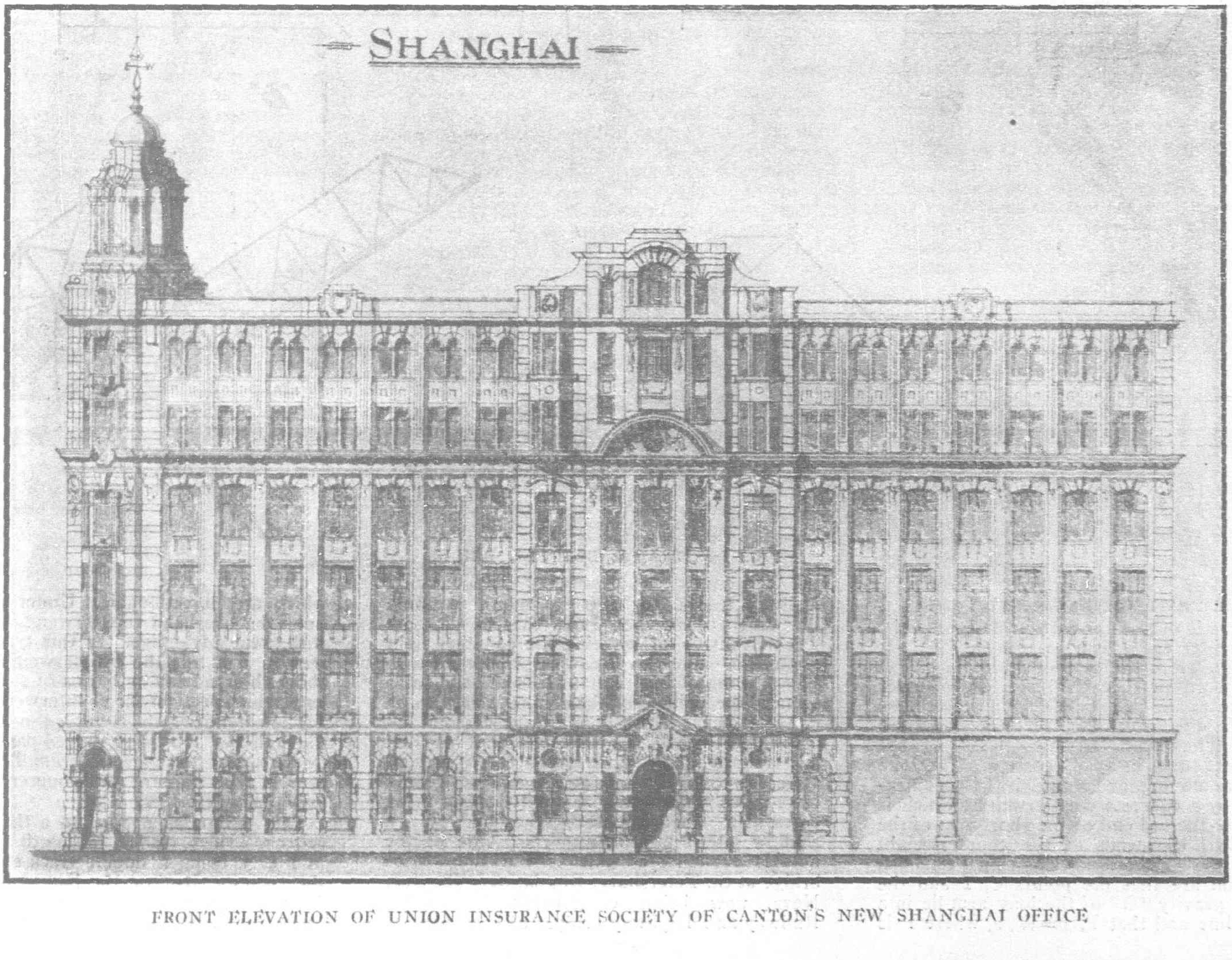
EXECUTIVE ORDER

MANILA, *October 30, 1912.*

It is hereby ordered that all Portland cement that may hereafter be purchased by the Government of the Philippine Islands for use in construction work to be done by or for the Government shall conform in every respect to the specification for Portland cement adopted by the departmental conference at the meeting held at the Bureau of Standards, Washington, District of Columbia, on February thirteenth, nineteen hundred and twelve, and approved by the heads of the several Departments, and promulgated by the President of the United States, and known as the United States Government specification for Portland cement: *Provided, however,* That section 24 shall be modified to meet the local conditions of the climate by reason of the fact that it will be necessary to make tests at a somewhat higher temperature than twenty-one degrees centigrade (seventy degrees Fahrenheit.)

NEWTON W. GILBERT,

Acting Governor-General.



FRONT ELEVATION OF UNION INSURANCE SOCIETY OF CANTON'S NEW SHANGHAI OFFICE

THE STRAUSS BASCULE BRIDGE DESIGN

In the last seven years "The Strauss Bascule Bridge Company," an Engineering firm of Chicago, U.S.A., has developed several designs of trunnion bascule bridge for Railways and Highways, which are very generally used throughout the United States and Canada, and have received marked consideration in Europe. Figure 1 (a-b-c-d) illustrates various modifications of the Strauss design. By inspection it can be seen that the designs are evolved from the plain trunnion bridge, but differing therefrom in general, in the use of an improved and more economical counterweighting device. The following is a brief description of the elemental principals of the respective types, illustrated in Fig. 1.

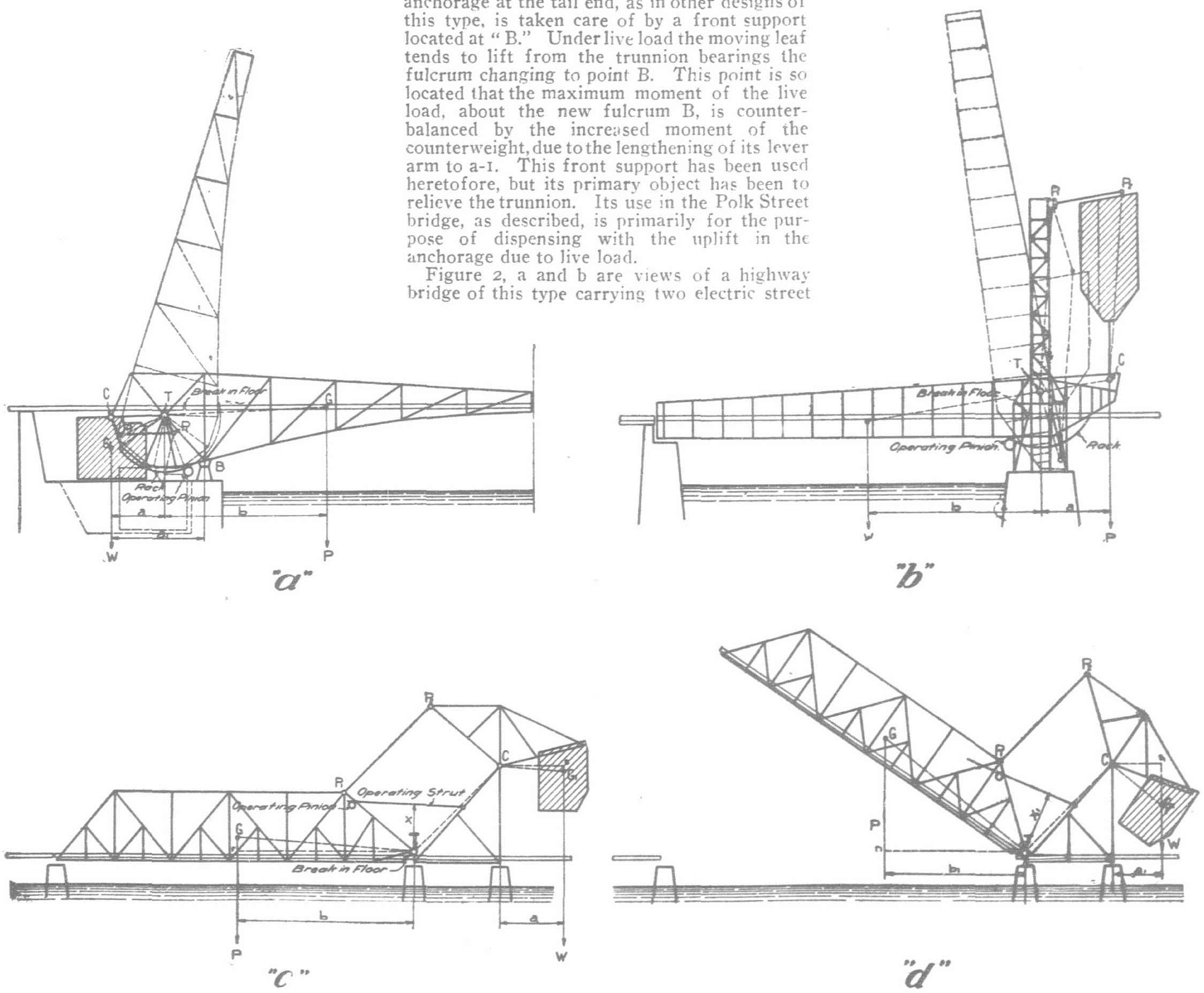


FIG. 1—STRAUSS BASCULE BRIDGE

UNDERNEATH COUNTERWEIGHT TYPE.

This type is one of the earliest designs of the Strauss bridge and as can be seen in Fig. 1-a. is quite similar to the type of trunnion bridge that has been in successful service for over seventy years and as exemplified in the famous Tower Bridge over the Thames river in London. The main trunnion "T," of the moving leaf turns in fixed bearings. The long arm of the moving, or bascule, leaf is counterbalanced by a concrete counterweight which is attached to the tail end of the short arm of the bascule leaf by means of the counterweight trunnion, "C." The conditions which establish equilibrium are that the points C, T and the center of gravity "G" of the long arm lie in a straight line and that P, b=W, a, where P is the weight of moving leaf in front of the main trunnion or fulcrum, and "B" its horizontal lever arm; W, the weight of the counterweight and "a" its horizontal lever arm.

The structure is operated by means of a pinnion which engages with a curved rack attached to the chord of the short arm of the leaf. The counterweight is guided in its motion by the link, P-1, P-2 moving parallel to itself by virtue of the parallelogram T, C, P-1, P-2.

The break in floor is in front of the main trunnion thereby preventing the opening of the bridge under live load. The unbalanced live load on the long arm instead of being counteracted by means of a bumper and anchorage at the tail end, as in other designs of this type, is taken care of by a front support located at "B." Under live load the moving leaf tends to lift from the trunnion bearings the fulcrum changing to point B. This point is so located that the maximum moment of the live load, about the new fulcrum B, is counterbalanced by the increased moment of the counterweight, due to the lengthening of its lever arm to a-1. This front support has been used heretofore, but its primary object has been to relieve the trunnion. Its use in the Polk Street bridge, as described, is primarily for the purpose of dispensing with the uplift in the anchorage due to live load.

Figure 2, a and b are views of a highway bridge of this type carrying two electric street Railway tracks, 193 feet in length spanning the Chicago river at Polk Street, Chicago. The advantage of pivoting the counterweight permits a longer lever arm as compared with types using fixed counterweight and also permits the volume of the counterweight to be disposed beneath the floor in any desired and convenient shape. Concrete instead of cast iron (seven times more expensive than concrete) is usually used for the counterweight, since space is not nearly as limited as in other types using fixed counterweights and only a shallow pit, if any, is required. One of the notable examples of this type is the Palace bridge at St. Petersburg, Russia, over the river Neva, now being constructed. Ten other Railway and Highway bridges of this type are in use or under construction, among which is the four track design to be used over Bronx Kills, New York, in connection with the famous Hell Gate Bridge. The bascules are two in number, each 175 feet in length, and will be used as stationary structures with provision for conversion into barcules later.

OVERHEAD COUNTERWEIGHT TYPE

In many places limited head room between high water and the bridge floor does not permit the use of an underneath counterweight, either without the use of cast iron for counterweight or without resort to difficult and expensive foundation work involving the use of deep pits, which are objectionable. Under these conditions the overhead counterweight type is used with great advantage. In this type, as can be seen in Fig. 1-b, the counterweight is carried above the roadway by means of structural steel legs, which bear on the counterweight pin C.

The counterweight is guided in its motion by the link P-1, P-2 being moved parallel to itself by virtue of the parallelogram T, C, P-1, P-2, as in the underneath counterweight type previously described.

This design as applied to a through girder railroad bridge, 65 feet in length, is illustrated in Fig. 3, being a double track structure over the Saugus river on the line of the Boston & Maine Railway Co. This design also readily lends itself to aesthetic treatment, as the

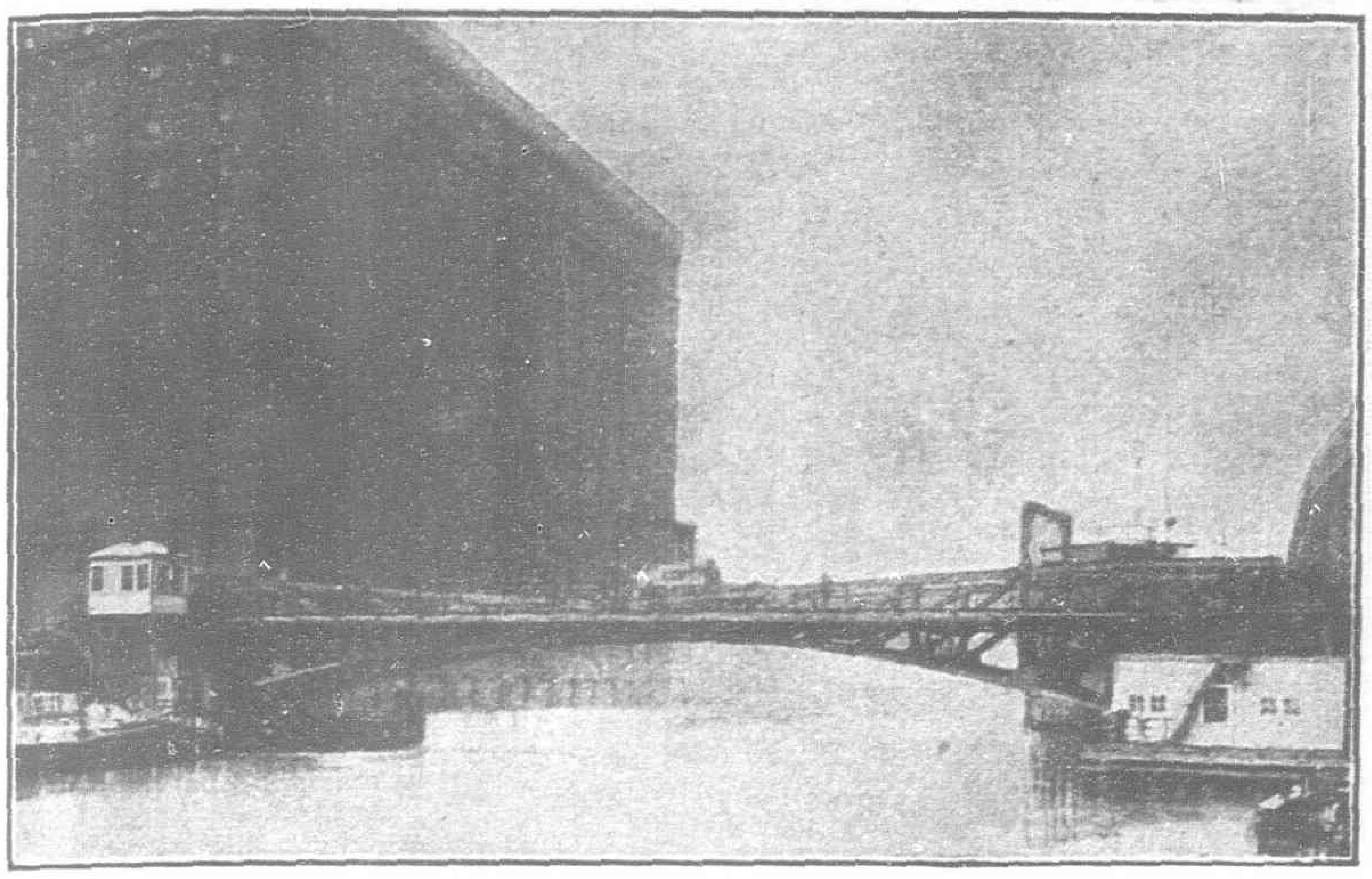


FIG. 2-A—(*See Fig. 2-B*)

counterweight can be designed as an ornamental portal, as exemplified in the Knippel's bridge across the Harbor entrance in Copenhagen, Demark, illustrated in Fig. 4. This latter structure has been in service for four years and during the open season of navigation is operated on busy days sixty times, for the passage of vessels. Other ornamental bridges of this type are the highway bridges at Camden, N. J., in satisfactory service for four years, another structure at Camden and the Osborn Street bridge at Winnipeg, Canada, both under construction. Forty bridges of the overhead counterweight type are in use and under construction.

HEEL TRUNNION TYPE

The Heel trunnion type is an overhead counterweight design and is best adapted for through truss spans either for light or heavy traffic. This type of bridge was first introduced by the Strauss Company about three years ago and since its introduction, thirty bridges of this type are in service and under construction. The rapidity with which this design gained such great prestige is due to the fact that it embodies new elements of design which render it not only more economical, but more efficient for through truss spans than any design yet produced, not only as regards superstructure, but for the substructure as well.

Figure 1, c and d, show line diagrams of this type. Point T is the main trunnion, located in the bottom chord of the truss, about which the moving leaf pivots; it is a fixed pivotal point, The counterweight trunnion C, also a fixed pivotal point, is located at the apex of a fixed triangular tower, about which the counterweight frame and concrete counterweight pivot. The counterbalancing effect is applied to the moving leaf through the counterweight link P-1, P-2, connected to the truss and counterweight frame by means of pins at either end. This link is parallel to and equal in length to a line joining the main trunnion T and counterweight trunnion C. In like manner P-1 T is parallel and equal in length to P-2 C. The center of gravity of the entire moving leaf is at G, and the center of gravity of the counterweight and frame is at G.' The moment of the moving leaf about the main trunnion is Pb, in which P is the weight of the moving leaf considered concentrated at G, and b is the horizontal distance between G and T. This moment is opposed by the equal moment of the counterweight Wa in which W is the weight of the counterweight and frame considered concentrated at G' and a the horizontal distance between G' and C. If $Pa=Wb$, the structure is in equilibrium considering the bridge closed. The condition in addition to the preceding necessary to establish equilibrium for all positions of the bridge is that line GT must be parallel to line G'C; they will then remain parallel as the bridge operates, by virtue of the parallelogram T P-1 P-2 C.

The dead-load pier reactions are constant and vertical for all positions of the bridge. It will be noted that the dead-load reaction of the rest pier is zero whether the bridge is closed or open. The dead-load reaction of the trunnion pier is practically equal to the weight of the moving leaf; the dead-load reaction of counterweight pier is practically equal to the weight of the counterweight and tower. These conditions are brought about by the separation of the points of support of the counterweight and the moving leaf, but at the same time combining their pin reaction through the connecting members of the parallelogram, so as to cause a resultant vertical and constant load on the piers. The combined center of gravity of the component parts of the entire structure does not move either vertically or horizontally as the bridge operates. For this reason the foundations of a bridge of this type are simple and economical. Moreover, by separating the reactions of moving leaf and counterweight the evils of concentrating the entire load on one pier are avoided As illustrative of this type of bridge, Fig. 5 shows a view of the Northern Pacific Railway bridge in use over the West Waterway, Seattle, Washington, and Fig. 6 shows a view in the open position, of the New York, New Haven and Hartford Railway bridge over the Cape Cod canal at Buzzards Bay, Mass. The moving leaf of these structures is 160 feet in length, the former a single track, and the latter a double track structure.

While only a general description has been given above of other types, on account of its comparatively recent and most successful introduction more detailed explanation is given below concerning the operation and construction of the heel trunnion type.

The earlier bridges of this type are operated by means of pinions located in triangular guides at the hip of each truss, which engage with cast racks bolted in the bottom of straight built-up operating struts, the ends of which carry collar bearings turning on pins attached to the inclined posts of the towers. The pinion and rack are held in mesh by the triangular guide which is mounted on the operating-pinion shaft through bearings at the center of that leg of the triangular guide which is parallel with the center line of the operating strut. The apices of this guide carry wheels which roll along the upper and lower flanges of the operating strut.

The operating pinions are keyed to shafts which extend through the gusset plates of the trusses, and turn in collar bearings bolted to these gussets. These shafts extend toward the center line of the bridge and are connected through reduction gears to the two operating electric motors, and to each other through an equalizer. This operating machinery is located at the portal of the moving leaf, suitable girders being provided to which the motors and bearings are secured. All of the operating machinery is suitably housed and is easily accessible by means of a stairway and hand railing on the end post of the truss. In the later designs of the same type now building, the operating machinery is located on the tower, the operating strut being pivoted at the hip of the truss. These operating struts have proved entirely satisfactory in service. The operator's house, containing the switchboard, controllers, etc., is usually located on brackets extending from the tower base.

When the bridge is closed and ready for the passage of trains, for extra precaution the leaf is locked to the piers at the front end, through there is no tendency for the live load to open the bridge. The locking is effected by means of a latch bar located under the center line of each truss which moves in a guide attached to the bottom chord. This bar passes through rectangular slots in diaphragms between the gussets plates of the truss, and fits securely into a casting provided with a roller, permitting easy movement of the bar longitudinally, which is bolted on an extension of the bridge shoe upon which the truss rests. The locks are driven by one 3-hp. motor. Emergency hand operation is also provided.

Power is not available for opening the bridge locks until the bridge is closed to train traffic and the train signals set at danger. In like manner power for opening the bridge is not available until the locks are fully opened. This condition is brought about by connecting the lock-motor circuit and operating-motor circuit, so that the actual movement of the locks and bridge mechanically completes and breaks the respective circuit, through the medium of contract switches, in their correct order. In closing the bridge, however, power is available for holding the bridge down firmly on the seat while driving the locks. When the bridge, in opening, reaches an angle several degrees less than the total angle of opening, current supplying the operating motors is cut off automatically and the solenoid brakes on the motors are set automatically, the bridge gradually coming to rest at the correct angle of opening. A foot switch in the operator's house at the base of the controller permits the operator to release the solenoid brakes at will. Besides the solenoid brakes an emergency brake is also provided which can be instantly brought into play by the operator. A casting is also provided on the triangular operating guide, which at the extreme limit of motion comes in contact with an oak bumping block located on the operating strut at its extremity near the operating strut pin; however, these blocks seldom come into contact, as the bridge is easily kept in control by the use of the brakes. Signals indicating the successive positions of the locks and bridge proper, consisting of incandescent lamps which show

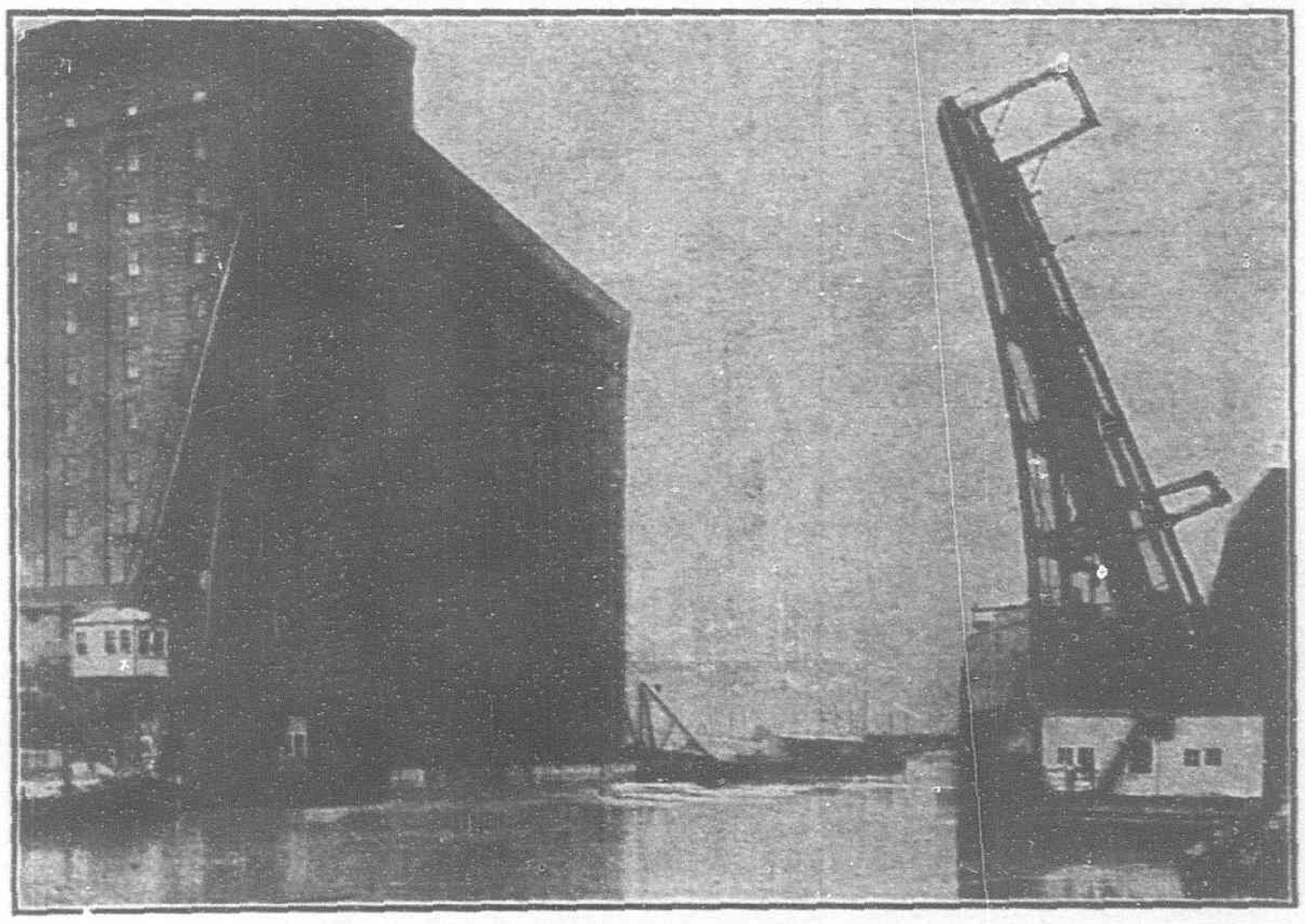


FIG. 2-A—UNDERNEATH CTRWT. TYPE (*See Fig. 2-A*)

Double Track Electric and Highway Length of Span 193-0" Over Chicago River at Polk St., Chicago, Ill.' U.S.A.

through colored lenses and which light automatically when the position of the lock or bridge which they indicate is reached, are placed in the operator's house convenient to his vision. These signals are labeled corresponding to the different positions of the locks and bridge which they indicate.

An air cushion is located at the center line of the bridge attached to the front-end floor-beam. It consists of an air cylinder and piston, the rod of which strikes a plate bolted on the rest pier as the bridge closes, and compresses the air in the cylinder so as to absorb shock. The cylinder is provided with a valve capable of regulation so that the air in the cylinder can be compressed in greater or less degree, as occasion may demand. In practice the balancing of the bridge is such as to render these cylinders precautionary only.

To guide the operator in closing the span a target is attached at the end of the leaf on the lower chord and a similar target is located on the top of pier; the two halves of these targets are painted different colors, so that when the bridge is properly closed the different colored halves of each target are in plain view of the operator and serve as the most direct guide in the proper handling of the bridge. At night electric and oil lamps illuminate the targets.

Besides the electric operation employed on all of these bridges, emergency hand operation is also provided. In some of these bridges gasoline engine equipment is provided as well; the engine is located in a fixed enclosure at the trunnion opposite the operator's house, and is connected to the machinery at the portal of the moving leaf by means of bevel gears and a shaft turning in bearings bolted to the outside web of the end post of the truss. When hand operation is used the motor shafts are connected to a cross shaft by means of sprocket wheels and chains, and the cross shaft has keyed to it grooved sprocket wheels which carry chains extending down to the bridge floor, furnishing a convenient means of applying power by hand. From four to eight men can be effectively employed in operating the bridge. The Red River bridge of the Transcontinental Railway was easily operated by two men in either direction when first moved. The hand operation on these bridges is designed so that the bridge can actually be operated, in case electric or other power is not available, within a reasonable length of time.

In moving the bridge, the power applied by the operating pinion at the point of tangency with the pitch line of the operating—strut rack, acts with a leverage equal to the perpendicular distance from this pitch line to the trunnion of the moving leaf. Referring again to Fig. 1, this distance is indicated by the dotted lines.

This machinery lever arm increases as the bridge opens, which means that as a greater surface is exposed to the wind in opening the bridge the leverage through which the power acts increases. This, while of little consequence, is rather an interesting feature of the design.

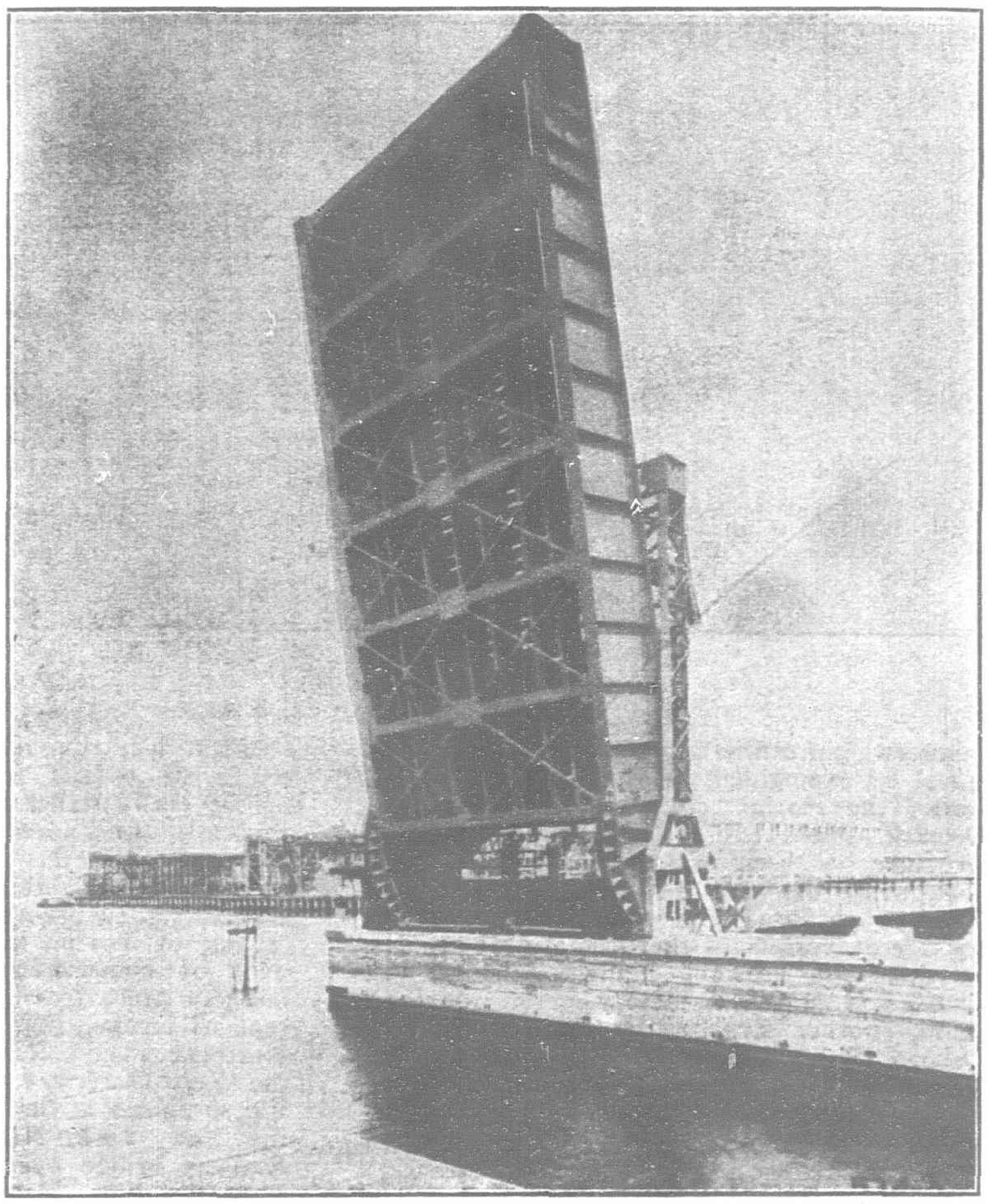


FIG. 3—OVERHEAD CTRWT. TYPE BOSTON AND MAIN R. R

Double Track. Length of Span 65'-0". Over Saugus River near Cambridge, Mass., U.S.A.

In one of these bridges, for the Peoria and Peking Union Railway Company, it was found advisable, in connection with the interlocking plant, to locate the operator several hundred feet distant from the bascule span in the interlocking tower at the crossing of the C., R. I. and P. Railway. In order to simplify and increase the safety of the electrical installation and operation under these conditions, the main controllers, circuit breakers, contact switches, etc., were located in a suitable fixed inclosure on the tower span of the bascule, but are operated by auxiliary controllers located in the interlocking tower. The conductors from the instruments at the command of the operator to the main equipment at the bascule span carry only very light current. The operator, instead of closing the switches and operating the controller directly by hand as when stationed right at the movable span, as in the other structures, does so at a distance through the medium of the auxiliary equipment, which requires, of course, very little expenditure of power to operate. This method of operation from a distance is made possible and safe mainly on account of the accurate balance of the structure and the use of the automatic cutoffs and the check system of signals indicating the successful positions of locks and leaf, which serve as a reliable guide to the operator even though not located at the bridge itself.

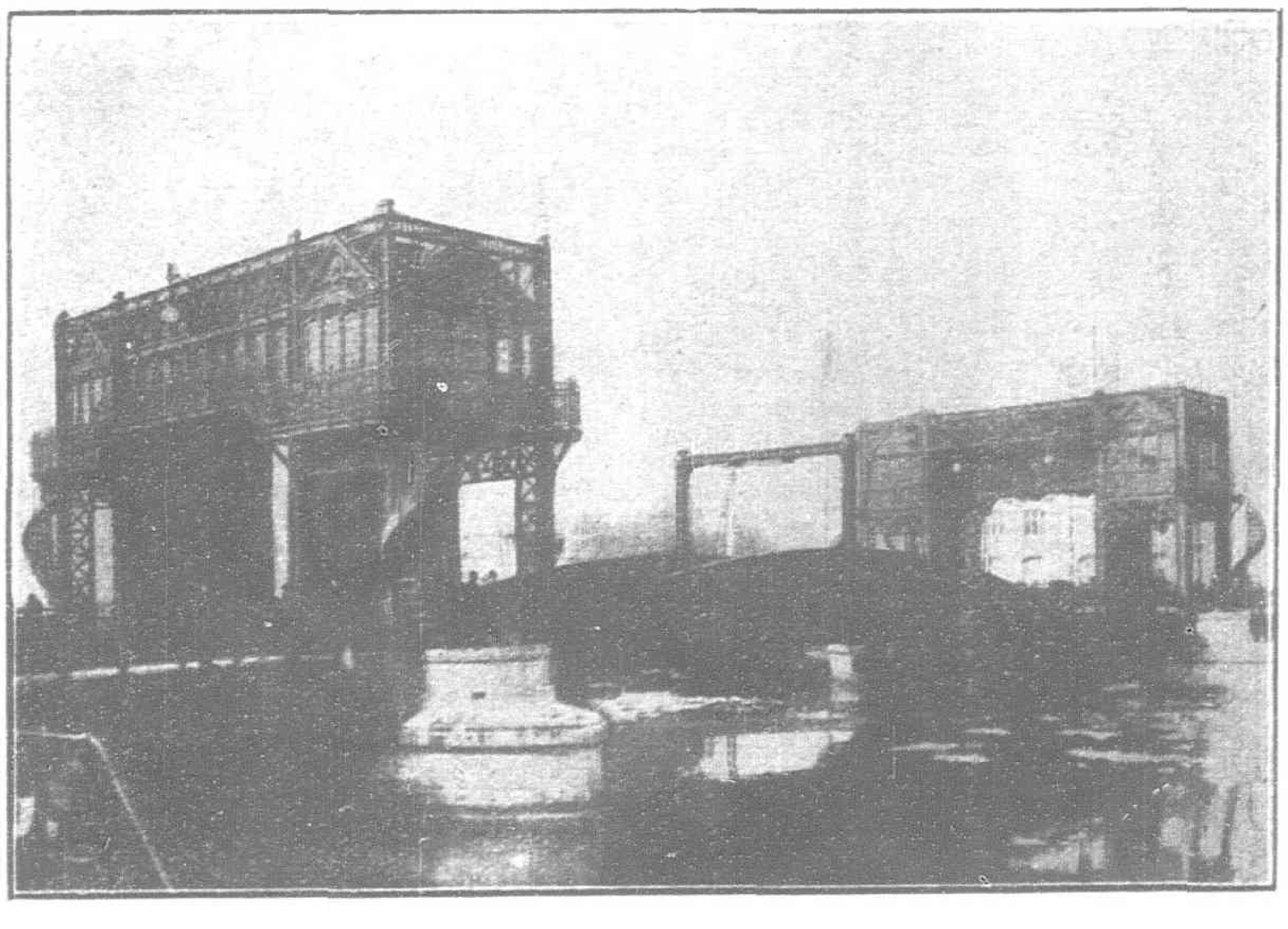


FIG. 4—OVERHEAD CTRWT. ORNAMENTAL TYPE

Double Track Electric and Highway. Length of Span 109'-2". Over Harbor Entrance Copenhagen, Denmark

The trunnion is composed of a pin made of forged steel and a cast-steel collar of considerably larger diameter: the pin, designed to take care of the bending and shear only, extends through the gusset and bearing plates of the truss, being held by Lomas nuts in the same manner as in a fixed pin-connected span. The cast-steel collar, which turns in the phosphor-bronze bushing of the journal bearing, is made of sufficient diameter to provide ample bearing surface and permit of relative motion with very little friction. This collar also furnished a convenient and effective means of securing the trunnion to the truss, by a circular series of bolts extending through the collar and the gusset and reinforcing plates of the truss. The counterweight trunnion and bearing at the apex of the tower are detailed in a similar manner. In the earlier designs (see Fig. 6.) the tower and truss of the moving leaf are not in line; the trunnion is held in fixed bearings, one located in the base of the tower and the other on a pedestal bolted to the pier, forming fixed bearings symmetrical about the center line of the truss, the journal bearing being fixed to the truss and rotating about the fixed trunnion. In the later designs, (see Fig. 5) the trunnion is carried by the truss and turns in a single journal bearing located at the base of the tower.

The advantages over the original design gained by arranging the towers in line with the trusses are as follows: Both the main trunnion and counterweight trunnions are less than half as long as in the original design; the bending moment is reduced to a minimum; both inside trunnion pedestals are dispensed with; and the distance center to center of tower posts is reduced about 5½ feet, thereby effecting a considerable saving both in the piers and the superstructure of the tower.

Since the trunnions are located directly at the pier tops, the points of resistance to lateral stresses are practically at the pier tops, giving maximum stability. This lateral stiffness insures quite perfect alignment of the trusses.

The counterweight proper is composed of concrete, and in most cases is held in a structural-steel box riveted to the counterweight frame. In the case of the Northern Pacific bridge and some other's the box is omitted, the concrete counterweight being thoroughly reinforced so that it is self-sustaining. Pockets are left in the counterweight so that weights can be added or deducted and a perfect balance obtained.

All parts of the bridge are thoroughly braced, the moving leaf in this respect being no different from a fixed simple span (and under live load it acts as such). The counterweight

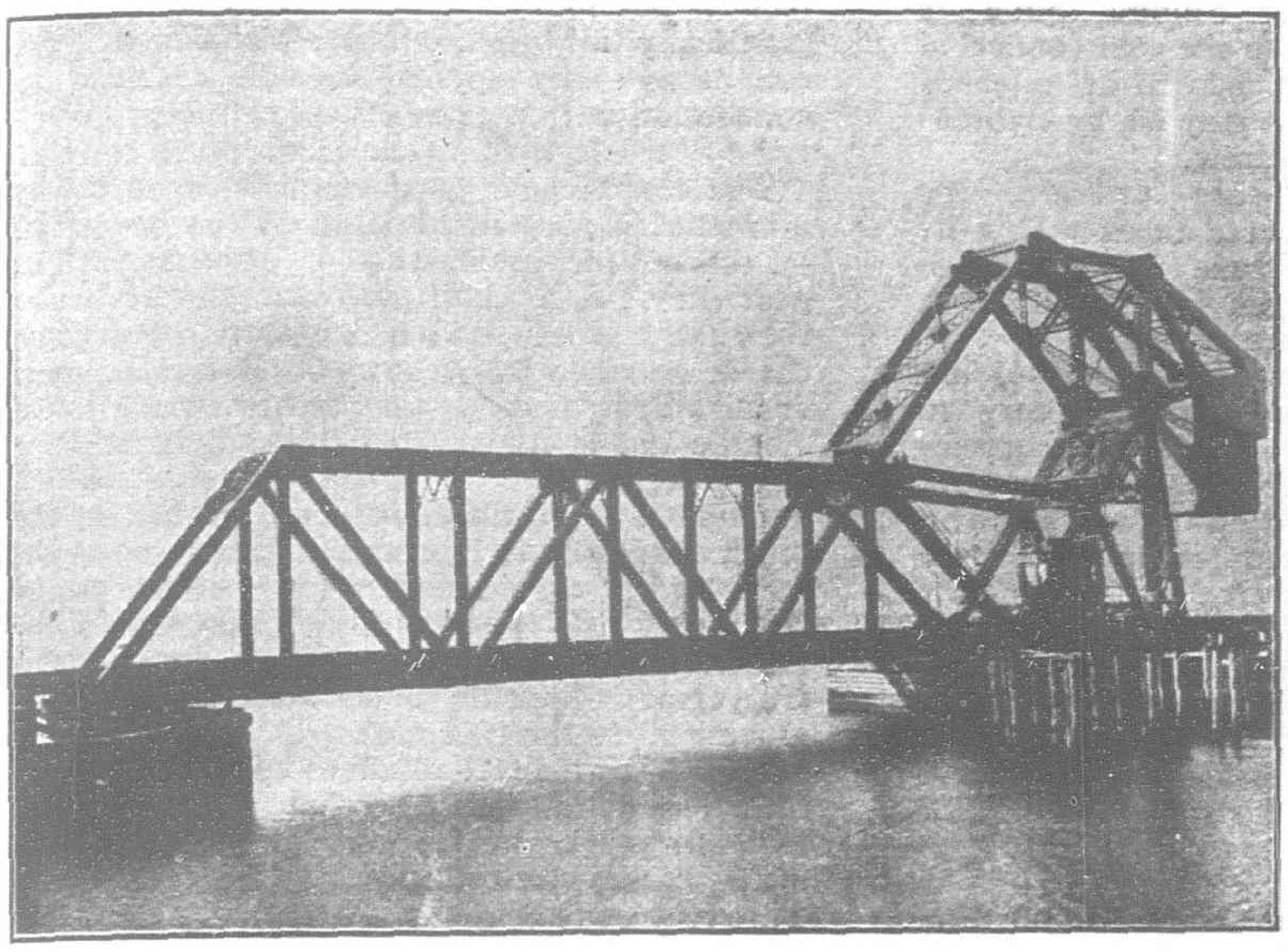


FIG. 5—HEEL TRUNNION TYPE—NORTHERN PACIFIC RAILWAY

Single Track., Length of Span 160'-0". Over West Waterway, Seattle, Wash., U.S.A.

tower has stiff portal braces both in the planes of the inclined and vertical posts, and the vertical posts are braced laterally by inclined members which extend from the counterweight pin down to reinforced-concrete brackets on either end of the counterweight pier. The counterweight trusses are braced together by mean of struts and diagonals, and the same is true of the counterweight links.

In the case of the Cuydhoga River bridge for the Erie Railroad it was found necessary to maintain railway traffic during erection. In order to accomplish this, provision was made in the design so that with the bridge open the lowest point of the counterweight would not encroach on the standard railway clearance. The old swing bridge was 220 feet in length, giving two narrow channels. The new structure was so located that the old pivot pier with modifications could be utilized for the rest pier of the bascule, and, the new span being 180 feet in length, the new trunnion and counterweight piers were built clear of the old rest pier of the swing. The latter was removed on completion of the new bridge.

An interesting feature in the construction and operation of these bridges is that the design is such as to reduce to a minimum the cost of maintenance, since all movement involving actual contact of materials takes place within exceedingly small compass, all such parts being completely protected from possible interference of extraneous influences. Furthermore, these moving parts are readily accessible for inspection and attention, thereby still further insuring against possibility of derangement. The performance of these bridges in actual service has been satisfactory, traffic not having been delayed either over the bridge or on the water.

Among recent designs of the heel trunnion type as illustrating its wide range of usage and adaptability, might be mentioned the following:

The 235 foot double track single leaf design for the Baltimore and Ohio Railway now nearing completion in Chicago, a duplication of which is soon to be undertaken adjacent to the bridge now being erected. The structure when open will stand as high as a twenty-story building and it is the longest single leaf bascule bridge in the world.

The 118 foot single leaf four track bascule now being constructed by the New York Central lines at Port Clinton, Ohio. This structure is the first four track bascule designed to lift as a single unit.

The 186 foot double track Railway and highway bridge erected by the Canadian Pacific Railway at Fort William, Ontario. This structure carries a double line of railroad tracks on the lower deck and a double track electric line and highway on the upper deck, being the first bascule bridge, ever built as a double deck structure.

The 336 foot single track double leaf design also being built by the Canadian Pacific Railway Company across the new United States ship canal at Sault Ste. Marie, Michigan. In this design the two leaves of the bridge when closed lock together. The top chords by means of compression locks and the lower chords by means of tension locks. The bridge when closed under live load acting as a *simple span* 336 feet in length. Heretofore double leaf bridges were designed as cantilevers, generally with a shear lock joining the leaves at the center, and, as typified in the highway bridge shown in Fig. 2; or as arches under live load, as typified in the highway bridge shown in Fig. 3.

For the bridge at Sault Ste. Marie neither of the preceding designs could apply on account of the extreme length of span and other local conditions. The cantilever design for Railway use is objectional on account of the heavy anchorages required, the deflection and play at the center and its higher cost and maintenance. A three hinged arch as in the Copenhagen design could not be used on account of the limited head room above water level. The length of span required, 336 feet, is also beyond the safe limit for a single leaf bridge. The simple span design used, eliminates these objections and at the same time permits the use of two independent leaves, thereby permitting the most economical and safe design and operation of the structure, considered from the standpoint of a movable bridge. Ample provision is made for expansion and contraction due to variations in temperature, and the locks are so operated as to prevent any wear taking place due to the sliding or movement of one surface against another. The entire super-structure, including counterweight towers at either end and complete operating and lock machinery cost about $155,000. The foundation consisting of four piers costs about $10,000 complete; the low cost being due to the excellent foundation conditions.

The designs of the Strauss company are worthy of careful consideration for any case where movable bridges are required. They act in the capacity of consulting and designing Engineers, furnishing complete plans and specifications.

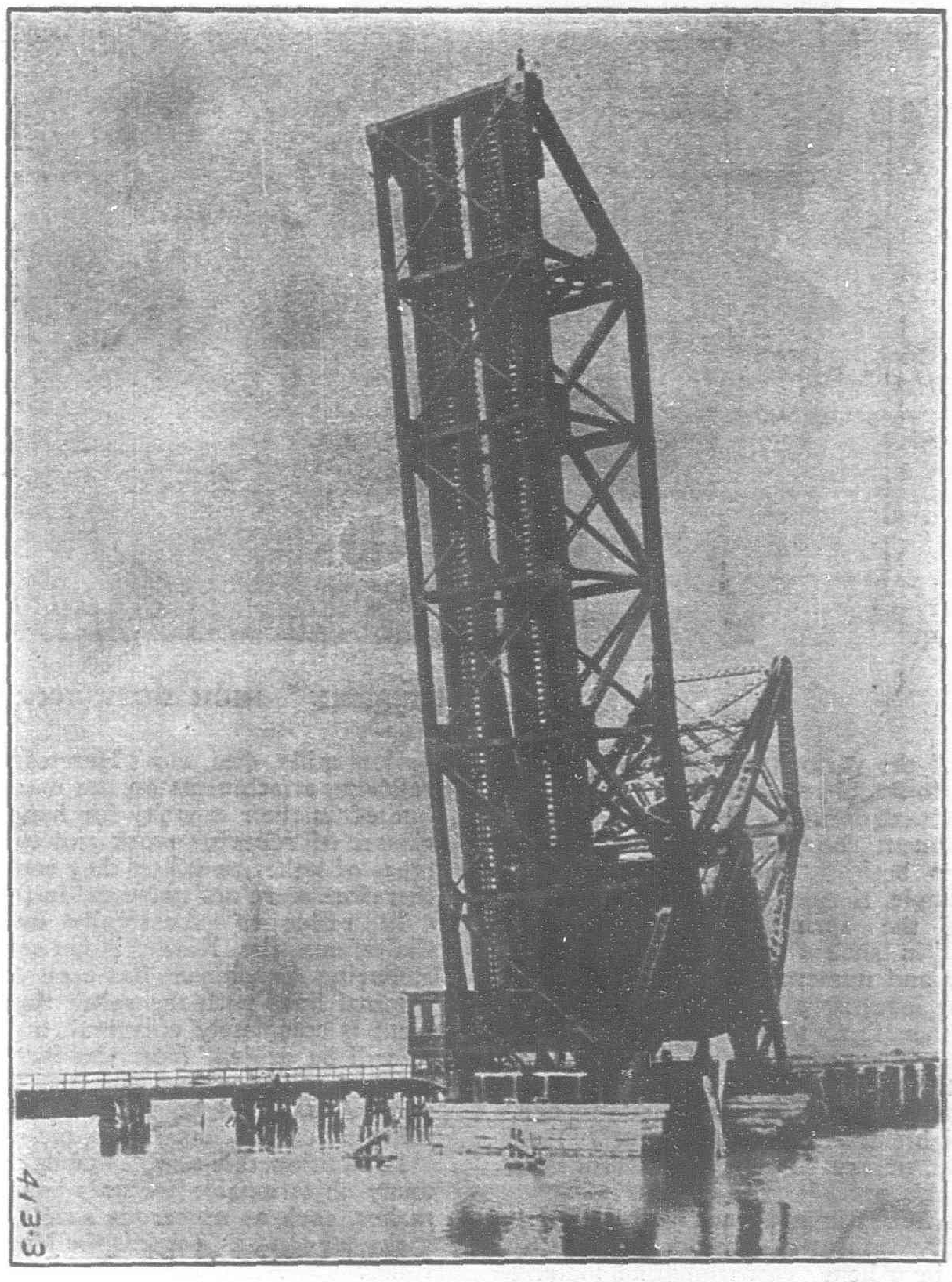


FIG. 6—HEEL TRUNNION TYPE—N. Y. N. H. AND N. R. R.

Double Track. Length of Span 160'-0". Over Cape Cod Canal, Buzzards Bay, Mass., U.S.A.

"AMERICAN" HIGH DUTY TOOL ROOM LATHE

"American" High Duty Tool Room Lathes are built in four (4) sizes, 14 inch, 16 inch, 18 inch and 20 inch. The basis of these lathes is the regular "American" High Duty Lathe with Patented Drop Vee Bed, Double Plate Apron, Patented Quick-Change Mechanism affording 48 thread and feed changes, Phosphor bronze bearings, etc., as described in the circulars covering the standard machines.

The term "Tool Room Lathe" is generally understood to mean a lathe fully equipped with the various attachments, such as the Taper, Draw-in and Relieving Attachments that are required to handle all classes of Tool Room Work. This type of lathe is also usually furnished with a pan for retaining the lubricant which must be used when working on hard steels.

It is not always necessary, however, for a tool room lathe to have all of these attachments, and we are therefore prepared to furnish any one of them separately.

In the following we shall not try to give a description of the entire lathe as that is taken care of by our regular circulars, but will devote our endeavors to a comprehensive description of the various attachments which are essential to a tool room lathe.

Taper Attachment.—The "American" Taper Attachment, shown by the accompanying illustration, is both in design and operation extremely simple, the construction being such as to avoid the spring and inconvenience usually found in such a device. All parts are amply heavy and numerous sliding joints are avoided, thus insuring a rigid mechanism and accuracy of tapers produced therefrom.

Bolted to and traveling with the carriage, the taper attachment can be instantly thrown into operation at any point along the lathe bed, by simply tightening one binder nut (J) on clamping dog, or can be as easily disengaged by releasing this nut.

When attached for taper work, the sliding shoe is directly connected with bottom slide of the tool rest by a heavy cast iron yoke, making its operation instantaneous, at the same time doing away with all lost motion, weakness and inaccuracy found in taper attachments directly connected with cross feed screw.

The Cross Feed Nut is always connected with the tool rest, therefore it can not fall to one side and out of position.

Nut for engaging the Sliding Shoe is arranged to slide in a slot in the yoke connected with tool rest, and is attached to or released from the yoke, as the case may be, by tightening or loosening a single screw.

Accurate Graduations are provided for quickly setting to any desired taper within its range, and in addition there is provided a convenient hand screw with graduated collar, used for extremely accurate setting.

When Taper Attachment is ordered *before* lathes leave our works, all work necessary to its application is finished so lathe and attachment reach customer ready for use, without any further work being necessary on his part.

When Taper Attachment is ordered *after* lathe leaves our works, it can be readily applied by the user, as all our lathe carriages are drilled to jigs, and properly tapped ready to receive a taper attachment, with a small amount of fitting. Complete information relative to such fitting is furnished by us. There is no necessity of a planed strip on the bed, or any work except a slight amount of fitting to the carriage.

Relieving Attachment.—For Application to 14", 16", 18" and 20" "American" High Duty Lathes. The function of the Relieving Attachment is to relieve or back off the flutes of rotary cutters, taps, reamers, end mills, hollow mills, dies, etc. Heretofore, all of the relieving attachments on the market have been limited in their capacity for handling different classes of relieving work and to the different types of lathes to which they could be applied, therefore were not universal in their action.

In order to successfully overcome these limitations the New "American" Universal Relieving Attachment has been designed along original lines with the result that this attachment is completely universal in its operation as will be evident from the fact that end and internal relieving can be just as easily performed as straight relieving work, such as relieving cutters, taps, hobs, etc.

In addition, this new design has eliminated the many objectionable features common to other makes, such as numerous shafts, mitre gears, racks, etc., and as a result the New "American" Relieving Attachment is very simple and efficient in its design, only a few parts being used to accommodate a very wide range of work and to provide an unusually direct drive.

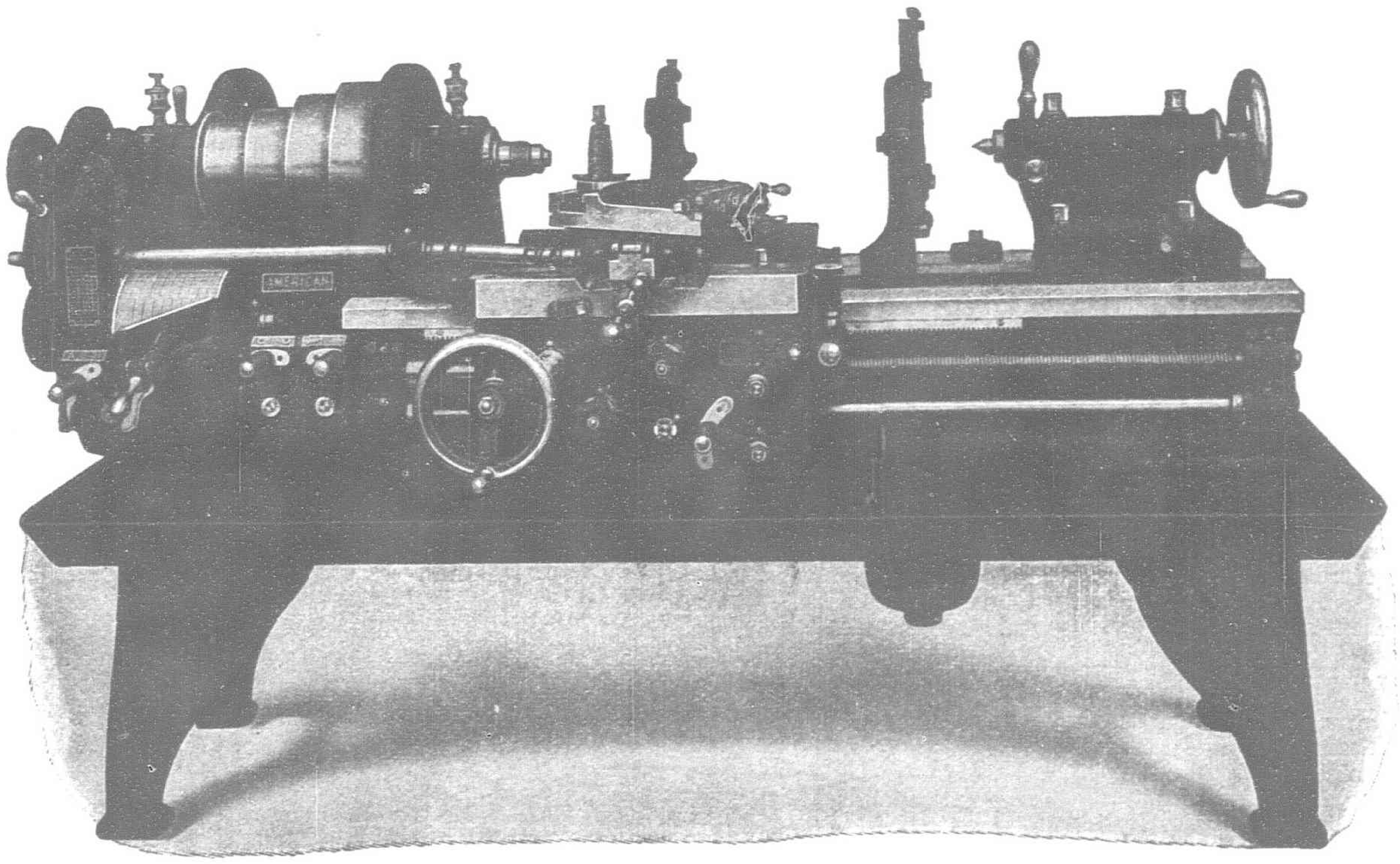
One of the important features of this new attachment is that it can be used with any type of "American" High Duty Lathe. In other words the application of this relieving attachment is not limited to one type of lathe as are practically all other similar attachments, but can be as easily applied to and operated in connection with a geared head or motor driven lathe as it can with a cone head lathe.

The change gear mechanism is supported by a bracket located at the front of the headstock on top of the quick change gear box. The gear train has a small quadrant which carries the change gears, and which is used to disengage the drive when not required. Power is taken from a spur gear located on the end of the spindle and is transmitted through the change gear mechanism to the driving shaft which extends through the supporting bracket on the quick change gear box and is journaled at the other end in a suitable bracket fastened to the left wing of the carriage. Between this bracket and the tool rest are located the Universal or knuckle joints which permit cross movement to the tool slide.

The driving shaft revolves constantly in one direction until the direction of the spindle rotation is reversed, at which time the driving shaft ceases to reciprocate the tool slide. This feature is of great value, for by means of it the tool slide will remain stationary when the direction of the carriage travel is reversed while the half nuts are engaged. By means of this same feature the tool can be withdrawn from the work and run back for a new cut, as is the practice in tap and hob making, without any waste motion of the parts and with absolute safety to the cams. This feature alone represents a very important advance in the development of the Relieving Attachment, and greatly increases the efficiency of this mechanism.

To obtain this condition a clutch connection is used between the cam and the driver which is operative in one direction only, therefore when the cam is set for operating in one direction the reversal of the driving shaft will cause the clutch, which is held in engagement by a spring to be withdrawn from the cam with the result that the cam will remain stationary and consequently will impart no motion to the tool slide.

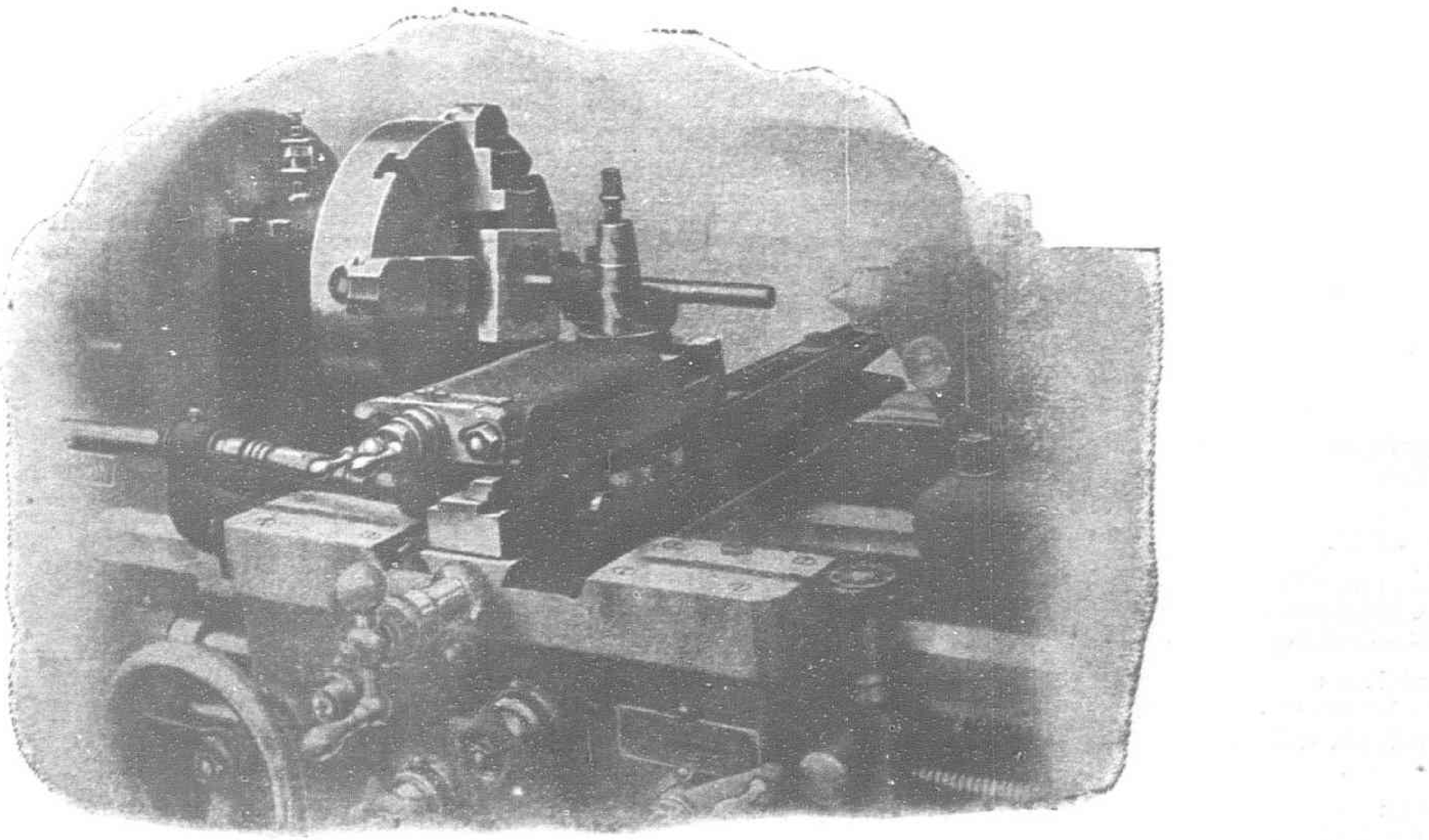
In order to obtain the entire range shown on the index plate, three cams, of one, two and four rises respectively, are provided in addition to the change gears. These cams run in an oil bath, are carried on the cam shaft which is located directly in front of the tool slide and can be very readily interchanged when desired. It will be noted by reference to the index plate that the most commonly



"AMERICAN" HIGH DUTY TOOL ROOM LATHE

used number of reliefs are obtained by making the slightest changes.

Probably the most important and valuable feature of this new attachment is that which permits the tool slide to be operated at *every* 30 degrees, thus providing twelve (12) operating positions within a circle. It is this feature that permits of relieving side cutters, end mills, and numerous jobs that heretofore could only by done by hand. On practically all other attachments that can accommodate this class of work, certain changes in, and additions to the regular equipment are necessary to make them operative on internal and end relieving work. On the "American" Relieving Attachment, however, aside from the simple adjusting of the tool slide to its proper position, there is absolutely no change or readjustment of the mechanism required.



HIGH DUTY TOOL ROOM LATHE—SHOWING INTERNAL RELIEF

Very convenient means are provided on this attachment for obtaining the various degrees of relief for either external or internal work. The adjustment takes place at the front of the tool slide through a thumb screw, while a graduated scale indicates the depth of the relief as set.

As a further proof of the adaptibility of this attachment, it can be applied and operated absolutely independently of the taper attachment. In other words, as far as the relieving attachment itself is concerned, a taper attachment is not required except when taper work is to be handled.

A standard compound rest is furnished in addition to the special relieving rest, the use of which for general turning purposes we strongly recommend, for naturally the constant use of a precision tool for rough work will impair its accuracy and unfit it for high grade tool room work.

As the compound rest is readily interchangeable with the special tool slide of the relieving attachment, only a few moments are required to make the change.

When necessary to relieve taps or hobs having spiral flutes, the "American" Relieving Attachment can be easily arranged to handle such work by the simple addition of extra gears.

The parts used in the construction of the "American" Universal Relieving Attachment are of the very best material for the service required. The cam yoke is forged. The cams, cam shoe and crank members are of tool steel, hardened and ground. The index bar in the top slide is of forged steel, all shafts and gears are well proportioned, and the entire mechanism is free from trappy construction. The compactness of the elements and their proper relation to each other overcome any tendency to chatter or backlash. All gears are securely covered.

The "American" Universal Relieving Attachment can be applied to any "American" High Duty Lathe below the 24 inch medium pattern size after the machine has left our factory, the application requiring only a slight amount of work on the customer's part.

Draw-in Attachment.—The Draw-in Attachment is a very simple mechanism consisting of a long hollow steel bar, a hardened and ground steel taper bush and as many collets as are necessary for holding different diameters of work.

The hollow bar which extends through the spindle has a wooden hand wheel at one end and is threaded internally at the other. The hardened and ground bush fits into the spindle nose and the collets are placed in this bush, the threaded end extending through and being engaged by the thread chased on the inside of the bar. The stock which is to be turned is passed through the bar from the head end of the lathe and is gripped in the collet or chuck. The turning of the hand wheel, in one direction or the other, causes the collet to either engage or disengage the work. Collets can be furnished for holding stock from the smallest fraction of an inch up to ⅞ inch diameter on the 14 inch and 16 inch sizes and up to 1 inch diameter on the 18 inch and 20 inch lathes.

Oil Pan.—There is very little to be said in connection with the oil pan, aside from the fact that it is made from sheet iron, its purpose being to catch the waste lubricant and thus prevent it from running off into the floor and being wasted.

Quality.—The "American" Tool Room Lathe is of very recent design, and embodies a number of original features which are described in our High Duty Lathe Circular. We guarantee the workmanship on these machines to be the very best that intelligent effort, combined with long experience, skilled workman and a complete jig and tool system can produce, and likewise positively guarantee every piece of metal that enters into the construction of our tools.

LIGHTING AND POWER

Electric Lighting for Cebu.—A franchise for the supply of electric light to the city of Cebu was granted by the municipal council of that city to Manuel D. Mambromati, on October 3. The franchise has been accorded for a term of 35 years, the contractor pledging himself to establish and maintain 1,000 twenty-five candle power lights at different locations throughout the town, to be determined by the city authorities.

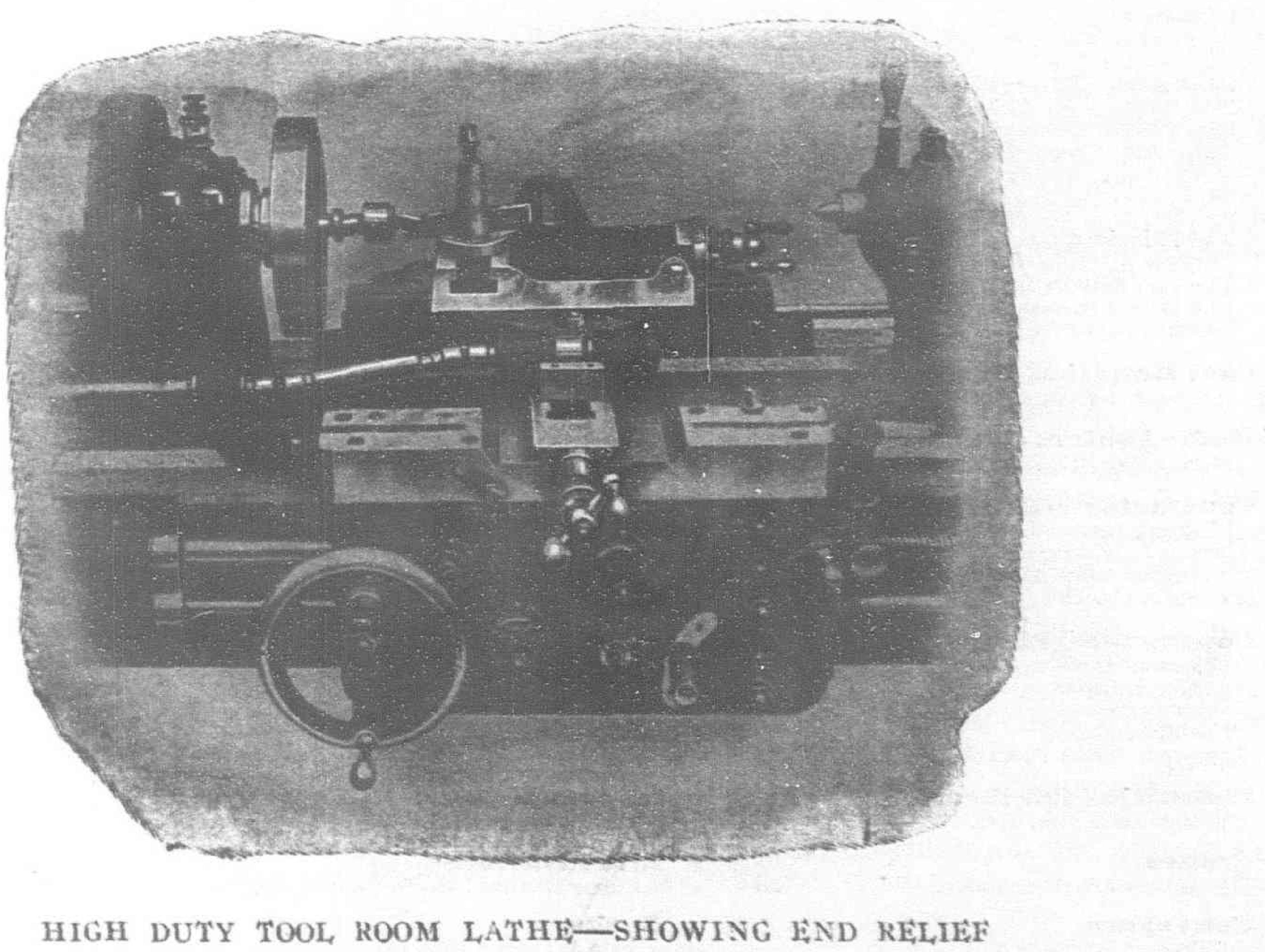
Manila Gas Company.—The Manila Gas Company has awarded the contract for the construction of the company buildings and tanks to Merritt and Wilson, the local contractors, and work will be begun immediately. The construction will approximate 100,000 pesos.

Articles of incorporation of the Manila Gas Corporation were filed on Oct. 17, with the executive secretary, and the company has been authorized to transact business in the islands as a local corporation.

Horace L. Higgins, who engineered the franchise for the gas company, W. A. Kincaid attorney for the corporation, Paaul Nagel, treasurer, Paul Grossman, constructing engineer, and Phil. C. Whitaker, are the incorporators. With the exception of Mr. Grossman the same gentlemen compose the directorate. Richard Dunkel is named as a director in the place of Mr. Grossman.

The company incorporated for P.1,500,000, divided into 15,000 shares of stock at P.100 par value per share. Of this amount P. 300,000 has been subscribed, and P. 75,000 paid in.

Its articles of incorporation authorize the company to take over the franchise granted to the Schweizerische Gasgesellschaft, of Zurich, Switzerland, to construct and operate a gas plant in the city of Manila, and to engage in such subsidiary commercial activities as may be necessary in the conduct of such business. The Swiss company is the principal stockholder in the new corporation.



HIGH DUTY TOOL ROOM LATHE—SHOWING END RELIEF

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